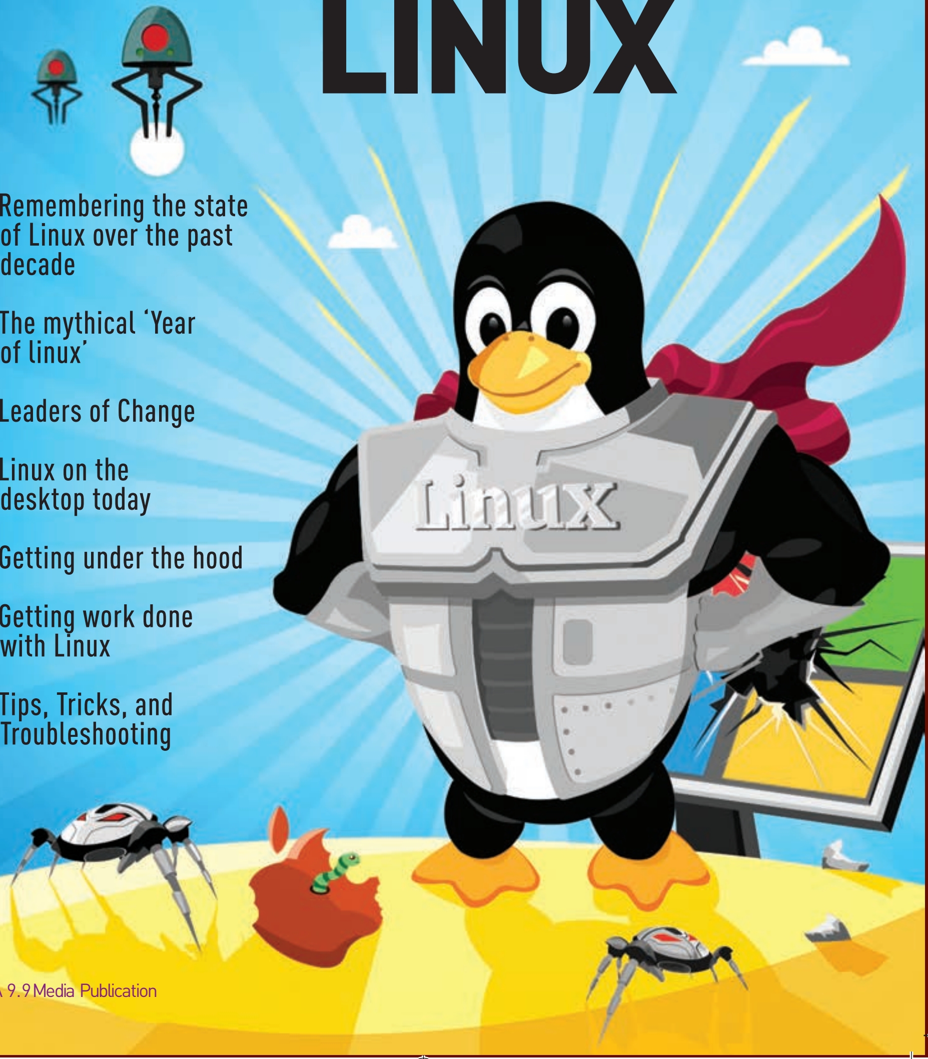
VOLUME 09 | ISSUE 10

digit FastTrack

YOUR HANDY GUIDE TO EVERYDAY TECHNOLOGY

# To REDISCOVERING LINUX



- Remembering the state of Linux over the past decade
- The mythical 'Year of linux'
- Leaders of Change
- Linux on the desktop today
- Getting under the hood
- Getting work done with Linux
- Tips, Tricks, and Troubleshooting

A 9.9 Media Publication

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FAST TRACK to

# Rediscovering Linux

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OCTOBER 2014

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Getting under the hood
It's now time to get your hands dirty. Read on as we walk you through the install process, the various GUI options and some Command Line wizardry.

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Getting work done with Linux
Planning to make the switch to Linux, but worried about replacing your favourite applications? We give you the lowdown on some of the best Linux alternatives out there.

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Tips, tricks and troubleshooting
Now that you have seen the power of Linux, take a look at some common issues you might face with a Linux installation and how to troubleshoot them. Also, learn some neat tips and tricks to make you a Linux pro

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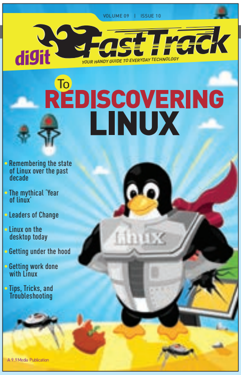
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**COVER DESIGN:** PETERSON P

# Follow the breadcrumbs

A*rgumentum e silentio* - A common fallacy wherein people assume what they don't see (or hear, if we're being literal) isn't there at all. And this comes to the fore in cases such as this one – assessing the popularity of operating systems. Naysayers have regularly asked the question, 'if Linux is so good, then why isn't anybody using it?'. Forgive the naysayers, they aren't the brightest of the bunch when it comes to the intricacies of the philosophical sciences.

Truth be told, we've met more people who've tried Linux at some point in time and given up on it, than those who haven't. Don't worry we're benevolent beings and we wouldn't begrudge you if you're one of them. Until as recently as 2010, the Linux ecosystem was not the most inviting of places, especially for a newcomer. Having allegedly been the domain of neckbeard hackers and boy-genius techies, Linux had somehow blocked itself out of the reckoning for the regular folk.

But that is not the case anymore. Distros have made sincere attempts at making sure the new folk feel at home. Give them a spin!

Then there were people who had truly given Linux a chance. They toiled hard, and learnt the mysterious ways of the sudo, hoping that they would eventually thrive one day. That day never came. Nobody would say that Linux evangelists haven't made a bundle of excuses of why, somehow, that thing you want to do on your machine is just not possible, at the moment. A majority of 'those things' are now possible to do. And we mean a vast majority, partly because Linux has improved a lot over the past few years, and partly because the rest has moved to that small thing that is almost entirely powered by Linux – the cloud!

Finally, there are people who've been looking at the whole thing from the outside, filling up with curiosity as to what the fuss is about.

They've been waiting in the crowd to hear that call saying that Linux has finally matured into not only a tolerable but an enjoyable computing experience. Here is that call!

If you are any of these people, then this FT is for you.

As the title suggests its your breadcrumb trail to rediscover something that held your curiosity at some point or the other. What it's certainly not is a "what is linux" type of textbook.

It tries to make working with Linux fun. Whether you want to know about the latest Distros, learn about the companies that are propelling Linux to bright new future, or even if you just want to get down and dirty under the hood with installation vectors, GUIs, window managers et al, this FT is your gateway drug. d

## CHAPTER #01

# REMEMBER, REMEMBER

### Our journey to rediscovering Linux starts off with an obscure diary entry

**Setting**: On an unknown day and date, sometime in October 2005, sometime in the evening in a college hostel...

**Digit Reader (d)**: So you brought this piece of hardware all the way from home but didn't bring along an anti-virus?
**Friend (F)**: No, I thought it wasn't needed, and the anti-virus that came bundled with the PC was ancient. I don't know man, I can't even locate my Windows install disk.

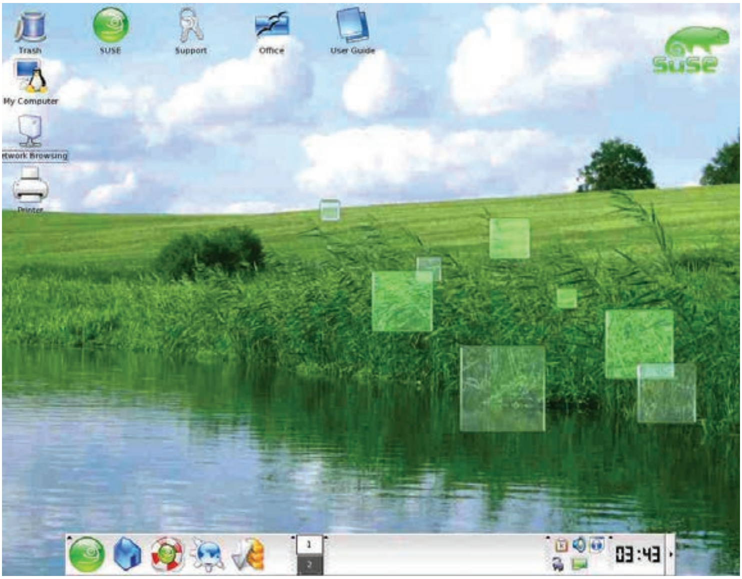
**d**: Well, have you tried Linux?
**F**: No, what's that? New version of Windows?

**d**: No, I found it in one of Digit's recent DVDs. And it's definitely not Windows. Everything about Linux is so different from Windows. I was so intrigued about it that I've already installed this Operating System, but I've yet to test this thing. And it has some weird name: Some SuSE or something similar. I had read about something related to Linux in Digit itself; so you know, I gave it a try.
**F**: Hmm, sounds interesting, but why'd you suddenly mention it when I told you about my virus problem? Does Linux not get infected by viruses?

**d**: Viruses apparently are mostly coded for Windows and since this is an entirely different OS, I don't think it has viruses. I have to look into it. Besides, my Windows had been giving me trouble too. There's nothing much on it anyway, just music so I didn't really care.

Two days later, when I actually got time, I went back to my PC and tried to start Windows. I popped in my Windows XP installation disk and ran the recovery process. Not surprisingly and to quite some relief, it worked. But my Linux installation was nowhere to be found. Plus, it seemed that my Windows partition had shrunk way more than it should have. As if this wasn't enough, I couldn't even find a way to look at the Linux files. There was simply no drive in 'My Computer' where I could see my Linux files. It was quite strange. Oh well time to shoot off a mail to Digit to ask for troubleshooting.

That's what it felt like for most of us who tried to use Linux in the first half of the last decade. If you could relate to our Digit reader's story, then you are not alone. Just like you, others tried using Linux years ago and somehow forgot about its existence. We bring you this Fast Track in the hope of putting you back in touch with one of the most popular and powerful operating systems. Read on and then decide whether you'd want to give it a shot again! Let's begin with the good old days...



If that desktop sends you back in time, we're on the same page

## The good (and certainly) old days

Quick question: what did 'XP' stand for in Windows XP? In case you didn't know, it stood for 'eXPerience' – and it delivered a pretty good experience, except for those few troublesome times.

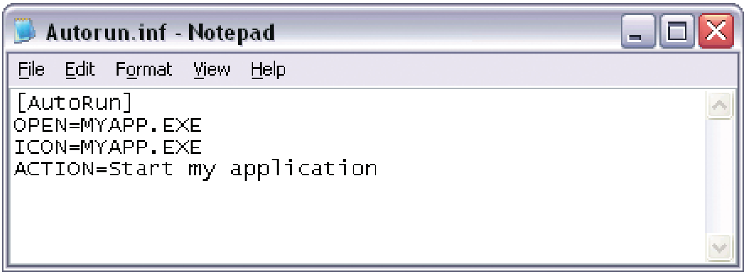
We're talking about times around the year 2004-2005. Apple was mostly unknown in India except for iTunes, which was relatively new so it didn't have many takers, especially with music managers like Winamp around. Mac was a distant dream for the few who knew about it. You may be able to recall how tech geeks would boast about having a 2.93GHz Pentium 4 processor and "whopping" 512MB RAM inside their computers. Pretty much anything that differentiated one computer from another was the processor speed, RAM sizes and hard disk sizes, all of them minuscule in comparison to the offerings today.

If you uttered the word ‘Linux’ among your peers, there’d be many a raised eyebrow. Not many had heard of Linux or ISO images. Even fewer had burnt it on disks and booted from it. That’s how unrecognised it was.

## What made Linux adopters try it?

Back then, Windows XP was popular, and this popularity made it the perfect target for virus writers. Since internet penetration was low, they used pen drives and CDs to transfer harmful worms. Lack of broadband meant that (very) few of us could actually update our anti-virus software.

One little mistake and your PC would slow down to a crawl. All you were left with then was one option – wasting another four hours reinstalling the OS and all your precious software. Because PCs running Windows were so vulnerable, this process may have to be repeated quite a few times pushing users to the point of desperation. It was around this time that many of them decided to try out Linux. And never went back.



```
[AutoRun]
OPEN=MYAPP.EXE
ICON=MYAPP.EXE
ACTION=Start my application
```

Little file, big troubles. Courtesy: Windows XP

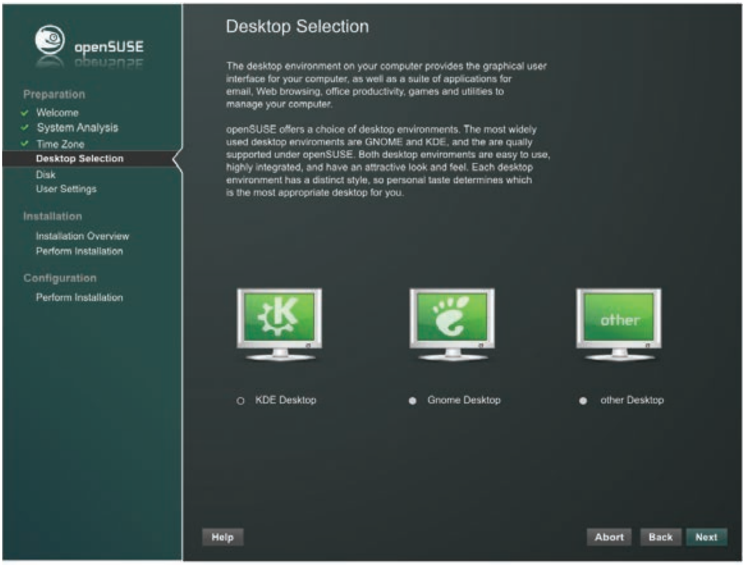
One of the Linux’s most popular virtues back then was that ‘it does not get infected with viruses’. While that’s mildly untrue, in a Windows-dominated landscape, it held the value of truth. The problem with carrying the ‘virus-free’ badge around was that people expected Linux to be just another version of Windows XP, but one that didn’t get infected with viruses. A smaller portion of people tried out Linux to simply test a new alternative and see if it worked the way they liked. Once again, users were looking for an operating system that was similar to Windows.

## Why's it even called an OS?

If you know people who've tried Linux, you may have heard them lament: "It doesn't let me install Microsoft Word, doesn't play my games or music from my library, looks different, 'My Computer' is missing, and how do I even dial up using my modem?" The problem with the Linux distributions in those days was that they didn't fit the technology landscape we were all so used to. The number of devices were increasing and there were very few tools which actually worked.

## Found lacking in many key features

SuSE 9.1, given away by Digit, didn't have mp3 playback capability, which put off many potential long-term users. The office suite 'Open Office' bundled with Linux distros was rudimentary, to say the least. It didn't support many of the features expected by regular users and this was another major setback. Another thing that bothered a lot of people were the unstable drivers. A majority of computers didn't sport a dedicated graphics card and the on-board graphics drivers weren't stable in a number of cases. Though kernel panics weren't common, nothing seemed to work out of the box.



Desktop Selection

The desktop environment on your computer provides the graphical user interface for your computer, as well as a suite of applications for email, Web browsing, office productivity, games and utilities to manage your computer.

openSUSE offers a choice of desktop environments. The most widely used desktop enviroments are GNOME and KDE, and the are qually supported under openSUSE. Both desktop enviroments are easy to use, highly integrated, and have an attractive look and feel. Each desktop environment has a distinct style, so personal taste determines which is the most appropriate desktop for you.

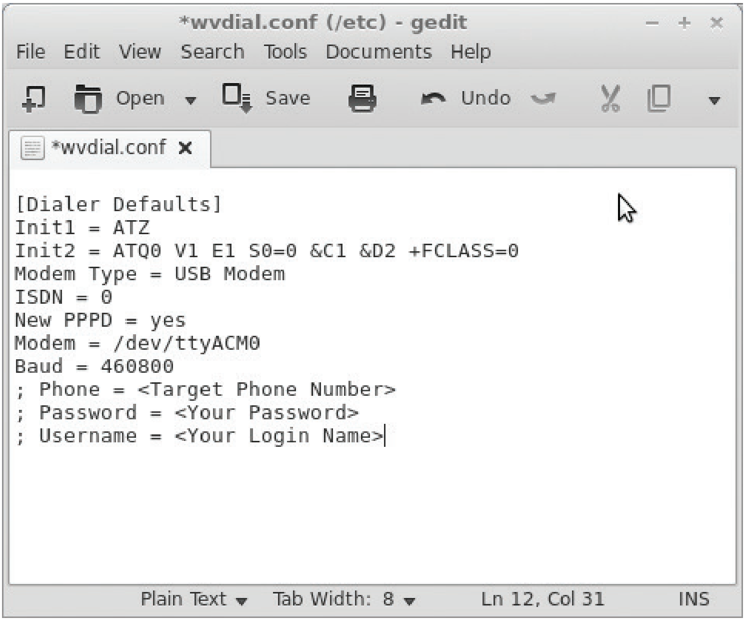
○ KDE Desktop
● Gnome Desktop
● other Desktop

Overwhelming amount of details for trivial tasks is the first thing that puts new users off. This is probably where Ubuntu got it right

## Installation woes

Installing Linux was a task and a half. In many, if not all cases, Linux users were automatically risking their Windows installation because at times installers made a mistake while calculating the partition layout (especially when trying to figure out where Windows was installed if it was a dual booting system with two copies of Windows installed on it). Sometimes, NTFS resize would fail and at other times, it was hard to figure out what 'ext2' and 'ext3' stood for. While ReiserFS helped to an extent, it didn't solve a number of other problems. To make matters worse, very few users actually knew what to fill in as the 'domain name' when Linux installers asked for it. As you can see, installation wasn't exactly a walk in the park so many failed and gave up during the setup itself.

If you got it up and running, well, bravo – you now had another new set of problems to tackle. Since the internet was not as resourceful as it is today, there was very little help and support available on the internet for the operating system. While forums like Digit's existed for this purpose, solving


*wvdial.conf (/etc) - gedit
File Edit View Search Tools Documents Help
Open
Save
Undo
*wvdial.conf
Plain Text
Tab Width: 8
Ln 12, Col 31
INS

```
[Dialer Defaults]
Init1 = ATZ
Init2 = ATQ0 V1 E1 S0=0 &C1 &D2 +FCLASS=0
Modem Type = USB Modem
ISDN = 0
New PPPD = yes
Modem = /dev/ttyACM0
Baud = 460800
; Phone = <Target Phone Number>
; Password = <Your Password>
; Username = <Your Login Name>
```

Remember the issues with plus signs, ampersands, idiot modes, usernames etc? Yes, the non-hotspotting era!

a problem required time and patience, and few had that. Another drawback for the fledgling OS. The lack of support seems to be the straw that broke the camel's back. Somewhere down the road, Linux was slowly forgotten.

## A spruced up Linux arrives

Ubuntu – an African word which stands for mutual dependence, good-will and help – was about to become a symbol of software freedom and expression. The first release was in October 2004. However, as it happens with every new product/service, it takes time to build reputation. By the beginning of 2006, Ubuntu began rising in popularity due to its promise of rolling out a new release every six months (which was very quick compared to Windows).

In addition, the fortune owned by Mark Shuttleworth (founder of Canonical, the company that builds and supports Ubuntu) was spent on free CD shipping. You could simply go to Ubuntu's website and with a few clicks and keyboard strokes, order a set of Ubuntu CDs at no cost. You didn't pay for the CDs and you definitely didn't pay for the shipping.

To top it all, Ubuntu popularised the idea of 'Live CDs'. You didn't have to install the OS to test it out. All you needed to do was boot from the CD and check how compatible your hardware was with the OS. If things worked well, you could run the installer, which lived on the desktop. In addition to all this, Ubuntu also offered an installer (called Ubiquity) which was pretty intelligent at making correct guesses about what you'd want. The installer simplified the most complicated of languages, enabling even non-technical users to install the OS.

It had one of the tightest communities with interesting and active forums (yes, way before stack exchange even arrived on the scene) where help was readily available.  With time, its ease of use only became more evident. You could nonchalantly type away a few lines on the once-dreaded terminal/shell/command-line or easily install software to play your music and movies in no time.

At the same time, OpenSuSE, Fedora, Gentoo etc. were also growing, however Ubuntu was light years ahead of them. Despite users being at loggerheads with one another in regards to what they wanted in the operating system, the final distro satisfied everyone. The community was somehow able to bring coherence to the chaos. One of the biggest reasons Ubuntu was getting so much attention was because it was based on Debian. This meant that the package manager in use, viz. APT was particularly intelligent and

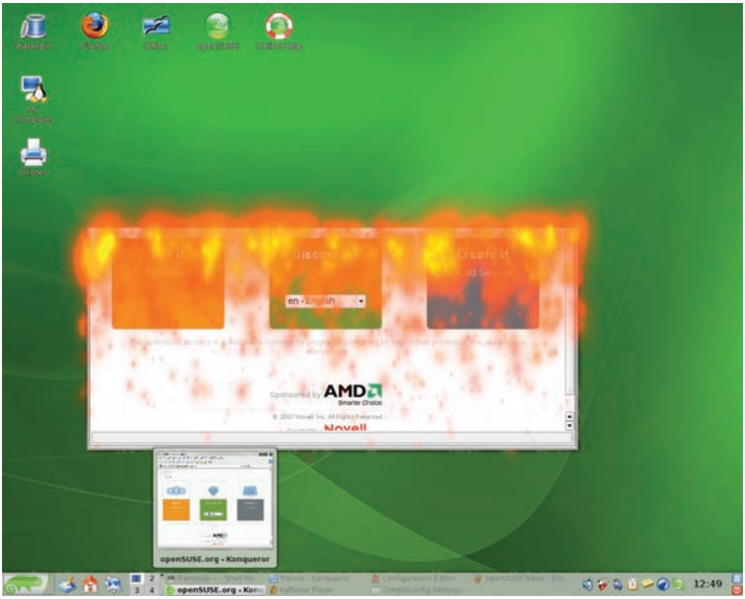
Ubuntu Live CDs were shipped worldwide by Canonical. That was a great push!

you could update your OS to the latest version without having to reinstall it via a DVD or USB drive. While this might look like a small change, it is what attracted aspiring geeks (and soon-to-be hardcore techies) to Ubuntu. Some fell in love with code while others drooled over the awesomeness of Linux administration. And as with any culture, all you had to do to gain mass following was to target the experts within the culture, the rest follow. Ubuntu, in that sense hit the right note. Though its interface was simple, the innards were very powerful (it was still Linux, after all).

## Hardware no longer giving a hard time

While all of this was happening, many drivers were being created for the Linux kernel. This was one of the fastest growth periods for Linux. The number of crashes and hangs being reported by users slowly began to decline. Though there were unstable drivers, the fixes were faster then ever. Networking was being stabilised thanks to new tools and network managers that came with desktop managers such as GNOME and KDE.

Besides this, graphics cards manufacturers such as NVIDIA and ATi had also started releasing drivers for Linux. You could finally play one of those Mario clones without crashing your system! Finally, you could plug



Very few things can turn heads like Compiz effects

anything into your system – a USB drive, hard disk, printer, Bluetooth adapter, Wi-Fi dongle or external display – and be assured that it would work (although there were times when they didn't work as expected).

One of the side effects of hardware compatibility (with graphics adapters) was the array of cool effects on your screen using 'Compiz Fusion'. You could draw in fire, make raindrops fall on your desktop, have wobbly windows, make your own animation to minimise windows and what not. All pretty much useless stuff, but super-cool. It could put the shiny new Windows Vista to shame because of its customisability. Forums were filled with users with questions related to how they could have the most enviable desktop in their neighborhood. All of this was playing out very well for Linux as a whole.

## The philosophy that lives

Digit is published and widely read in a country that prides itself on its harmonious and helpful nature. Open Source fits in with that philosophy very nicely.

The open source movement thrives on the use of free and open code. It encourages you to learn, develop exciting new innovative software and share your work. Those who stuck around with Linux while it was undergoing its metamorphosis from instability to stability would know how mere involvement of users (not developers or testers, just users) helped Linux grow at a tremendous speed. Along the way many bugs were found and fixed because of this involvement giving us the highly stable Linux we know today. The open source ideology has influenced every little aspect of our lives. We have so many free tools to complete our daily tasks that we tick off a large part of our daily "to do" lists automatically without us noticing it.

The Open Source movement gave us some of the best software around

The riders of the Linux wave come from all backgrounds, most often related to the web. Web development and infrastructures that power the web are usually backed by open source software. Also among users were school labs and universities, who had begun to realise that Microsoft was not the only way to make a computer come to life. Its adoption has made Linux what it is today.

So what is Linux today, anyway?

## Fast Forward to present day: Installation

While Linux purists might dislike Ubuntu for reasons ranging from "Unity is a bad UI" to "developers don't listen to the community", the fact remains that Ubuntu has turned out to be a leading distribution. Built on the foundation of Debian's architecture and an awesome package management system, it delivers timely updates (as opposed to Debian, which focuses on stability) and has a very user-friendly installer. If you happen to stick to the default options on Ubuntu's installer, on most occasions, it works quite well and ensures that your other operating systems are unaffected by its installation. This means that you can rest assured that a Linux installation won't prevent access to the rest of your data.

If you compared it to the Linux from a decade ago, you'd recall that mounting a NTFS partition was a pain, more so when you wanted to write data on to a NTFS partition. Now, NTFS volumes are automatically detected and mounted for you.

## A NOTE ABOUT VIRTUALISATION SOFTWARE

While it's safe to try any of the popular Linux distributions today on your machine, it's advisable that you install the OS on a virtual machine. Especially, if you have a dual-boot setup, create a virtual machine, simulate the installation and see if you understand the procedure. While virtualisation will help your mind be at ease and make sure that everything goes as smoothly as possible, it's crucial to have your important data backed up. When installing an OS, all kinds of things can go wrong – from power failures and unexpected hangs, to boot-loader installation failures and partitioning and resizing processes going wrong. Hence, please back up your data.

Also, if during the distro's installation process, any kind of media test is offered, do run it. Again, it wouldn't hurt to have a power backup system (UPS) just in case electricity goes off. For laptop owners, this would mean ensuring that your machine's battery is in healthy condition and well charged.

As far as networking is concerned, India has caught up to speed and its internet services are now more reliable than ever before. While most of semi-urban India still surfs the net on half a megabit per second, it's not uncommon to see multi-megabits per second (usually 2 or 4 Mbps) connections. This supports Linux installations since the installer will be able to quickly download system updates.

### Effects of desktop computing

Users have come to understand that a machine's usability trumps fancy effects. An OS with great effects that crashes when you launch the browser wouldn't see the light of anyone's living room, while one with decent enough animations and great usability and robustness will prosper and serve its users for years. Linux, in this aspect, has made tremendous strides. The apps that would once fight each other for supremacy are now all being integrated into decent and stable UIs to provide a coherent experience. This means that many of Mac OS X's innovations are featuring alongside Microsoft's and the OSS community is only too pleased with the experience.

## Networking

This is another aspect of computing that has gotten better with time. Wi-Fi hotspot and USB tethering features built into today's smartphones mean that we no more have to rely solely on EDGE/3G networks. The low dependence on network interface configuration can be attributed to higher usage of Wi-Fi in homes and offices. And no matter which version of Linux you use, Wi-Fi support is almost always appreciated.

## Plug and Play

Frankly, whoever came up with the phrase 'plug and play' must have been overoptimistic – few things work straight out of the box. When you plug in any device such as your pen drive, your OS looks for the appropriate drivers to use before you can actually play the plugged in device. For that to happen, your OS must at least have the generic drivers, if not the specific ones for the device. This has been a source of constant trouble.

While in the past, attaching a printer was tricky, now it's a walk in the park, especially with Linux. The driver support has been augmented to the point where even graphics cards that previously played spoilsport today work in harmony with the default open source drivers. Today, most major manufacturers are considering Linux when designing hardware and opening their arms slowly to the Linux community. Result: you can actually plug and play most of your peripherals.

Companies are making Linux-based laptops. Just ask for one from your vendor

## Daddies of tech love the tux

Despite not having much to do with end-user software, companies like Dell, Oracle, HP, IBM etc. have a huge say in the market. While some are them are hardware manufacturers, others are enterprise service providers. And guess what – they all either have their own version of Linux or are actively working on it.

While the enterprise scenes are of no concern to most of us, the average users, it might be interesting to know that support for Linux has been rising and a number of systems now come with Linux pre-installed instead of 'FreeDOS' (FreeDOS in the practical world means "please install whatever you like").

## Apps – the meat of the matter

It has been said countless times that apps and their quality determine an operating system's popularity, usability and growth. Linux has been fortunate in that arena lately. Here are some of the features of its popular software:

1. Word processors have matured enough to include basic grammar checks.
2. Email clients for Linux are more stable and intuitive.
3. More video players are available. Also, many music management apps are present. That means entertainment is no longer a dry topic in the

There are all types of crossplatform apps available for Linux today.

Linux universe.

4. Internet connectivity, as we've already said, has improved. Also, except for Internet Explorer, almost every other browser works on Linux.

5. A number of multimedia editing tools are available and unless you're a multimedia professional, these tools will suffice your needs.

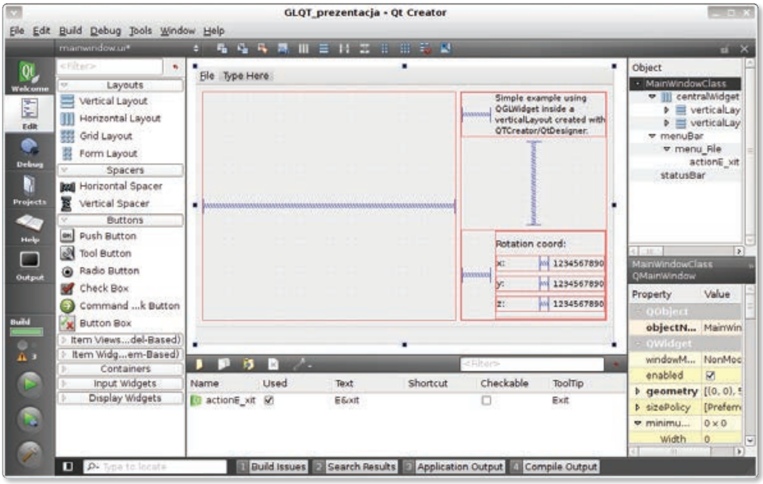
6. Periodic updates are the best around. Both, apps and system updates can be fetched periodically or on-demand.

Above all of these features, there's this: Linux systems have really got some cool login sounds these days. We all love login sounds, don't we? ;)

## Development

Now this, in a way, is serious. Development of any software of enough importance is a difficult task. And while there are languages that claim to be portable across platforms, they do not solve all problems. Then again, there are many languages today in which software and services are written. Many of these languages were unheard a decade ago. E.g. How many people had heard of *lua* or *erlang* 10 years ago?

As it happens, Linux is great for development, thanks to the people who make languages. E.g. if you are a web developer, you have PHP, Perl, Python, C, Java, ruby etc. They all work on Linux. Probably the four popular



Simple example using QGLWidget inside a verticalLayout created with QTCreator/QtDesigner.

| Name | Used | Text | Shortcut | Checkable | ToolTip |
|---|---|---|---|---|---|
| actionE_xit | ☑ | E&xit | | ☐ | Exit |

Qt Creator is a very capable C++ IDE for cross-platform C++ development languages which won't work on Linux are: C#, Visual Basic, Swift and Objective C because they were build by Microsoft and Apple for their respective platforms only.

But that was very much the landscape back in 2005-2006 too, right? So what is new? The new is – many tools and frameworks have sprung up which allow you to develop cross-platform apps. For example, you can make a C++ app using the Qt framework on Linux and be pretty sure that it can work on Windows and Mac too as long as you have not used any Linux-specific code which cannot run anywhere. You can create a website in PHP using Windows and given you have maintained the modularity and portability of your website's codebase, it will work on a Linux server without trouble. A decade ago, it was not exactly the scene. Many frameworks came up in the last decade which have helped move the developer's focus from "How do I get to run this code on XYZ platform" to "How do I implement the new feature?" This is one of the key points where Linux has made a significant progress – getting into the list of target platforms for many cross-platform development IDEs, frameworks and languages.

Are you a developer? Well, Linux's got your back, sire!

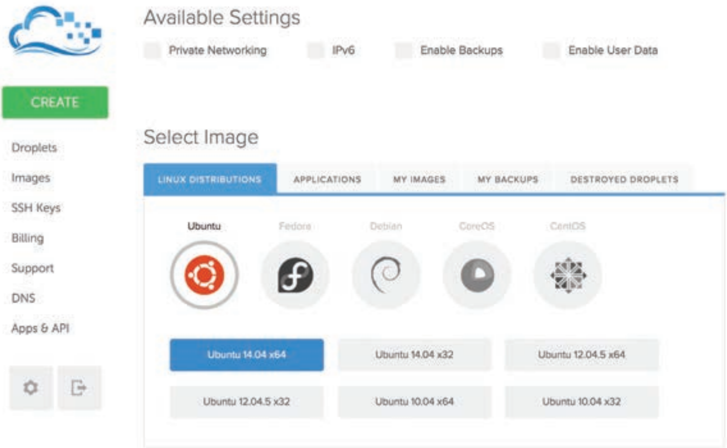
## Linux is made of air – it runs the cloud, after all

So you want to launch a new website or a back-end service on the Internet and your predictive abilities guide you to consider scaling your site or service on to multiple servers. So what do you do? You create a virtual machine instance. And what do you choose for the OS? Well, as long as your code is cross-platform compatible, it is very likely that you would choose Linux because it is much cheaper than Windows. For the same reason, Linux has been the most popular OS that gets the cloud(s) blooming.

Be it DigitalOcean or AWS or Rackspace, you would get Ubuntu server everywhere. In most cases you would also have the freedom to choose from Debian, RedHat, SLES etc. Even if you want to go for shared hosting services, Linux is everywhere. Hence, the popularity has been increasing.

## So should I try Linux? And if yes, where do I begin?

We hope, by now you should be ready enough to give that beast a run, at least on virtualisation software. Testing on real or virtual machine is your choice but we are going to tell you which one you should try. Now, you need not stick to our suggestions, feel free to try other distros. But depending



Linux is widely supported on server implementations

on how technically inclined you are and your past experience with linux, we have listed a few Linux distributions for you starting from easiest to most difficult.

1. **Ubuntu**: The most popular name in the *NIX world right now. If you've only fiddled with Linux without getting too deep into it then this is the door you should take. Linux Mint is on the same level in terms of familiarity.

2. **Fedora**: For a very long time, it has been the name that represented Linux in day-to-day life, that is, until Ubuntu took over. It has a slightly more sophisticated installer than Ubuntu and requires a better understanding of Linux.

3. **OpenSUSE**: YaST, the most sophisticated installer for any operating system comes with OpenSUSE. It is a refined GUI based installer that blows your mind away with the level of options and customisations it offers. Which is why using it is a little more intimidating.

4. **Arch**: This one is mildly difficult and can be a stepping stone into the realm of difficult-to-use Linux distros. It follows the 'rolling release' philosophy which means that instead of having to install a new version of the operating system the individual components are updated. Arch Linux's Wiki (which is also helpful for most Linux users, of even different distros) is one of the best places to gain information about how different internal parts of Linux works.

5. **Gentoo**: It's just like Arch but instead of downloading packages, it downloads package sources and compiles them on your machine.

6. **Slackware**: If you have the patience to master this one then all other distros will start seeming simpler. Slackware is one of the oldest distros and is nowhere close to being famous. Slackware does not come with any package managers, which means you must know how to compile software. You will have to configure everything from networking to GUI and everything in between.

7. **LFS**: "Linux from Scratch" is not a distro. It is a method of creating one of your own. If you can pull this off, then you have truly mastered the art of the nix. You have to compile your kernel, toolchain, compiler and other essential components (like binutils) and recompile just to make sure. Then you continue compiling and later create a partition, dump your compiled binaries onto the new partition and finally setup the bootloader. And this is just the beginning. But if you can get an LFS running and get it to work exactly the way you want it to then you'd become one of those walking talking linux wikis.

Now, there are a lot more other distros out there but we can't go through them all. So, try out whatever you like, experiment, lose a few windows partitions to screwed up installations and learn. You've messed with linux long back and it's high time you dive into the deep end again.d

# THE MYTHICAL 'YEAR OF LINUX'

## What is the "Year of Linux"? The holy era of a completely open-source and free world? A digital renaissance of sorts?

A lot can be learnt about a person's... well, personality based on their preferences. If you like instant coffee, you're probably an aficionado of the buzz caffeine gives you. If you like your beans medium both, in terms of roast and coarseness of the grind, and you let boiling hot water be forced through a lightly compressed layer of coffee powder, you're probably a prude who does a lot of reading (Yes you are. Look at this face, it's absolutely expressionless, nary a hint of a smile). But, if your coffee is a blend of Plantation A, Pea Berry and a generous dash of Chicory. You pull out a coffee filter, season it by pouring a little hot water on the insides, pack the coffee powder in a way that is neither too tight nor too loose and can only be described as 'just right' and pour 'hot' water on top and let it sit. Let the water percolate and collect in a container below. Pour a dash into a tumbler of hot milk, add a little sugar and pour it back and forth between the tumbler and a cup, you're either suffer from OCD or are a coffee connoisseur.

When it comes to one's preference of OS on their machines, users fall into three broad categories that are not too dissimilar to the example stated above. If you run windows, you probably use it for regular things like typing documents, making spreadsheets, a little video and a little gaming. If you swear by Mac and you're not an "editor" of any sort, the type who actually needs Mac apps (there are a few types. Refer to the previous edition of FastTrack for more details.), you're just using it because you think it's cool (Are we allowed to call them hipsters?).

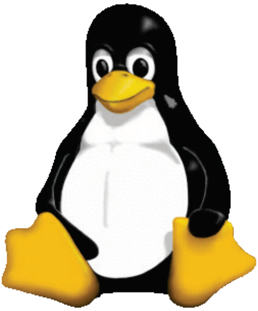
However, if you dream of a time when you don't have to pay for the OS your computer runs (assuming of course that you're the type who's actually paid for your copy of Windows), then you're a Linux fan and that magical time is the Year of Linux (Yes, OS X is now supposed to be free, but it comes with too many caveats to be considered as such). A time where all you pay for is the hardware and maybe a little support (Again, we're not considering Apple because you can't choose your hardware, purchasing a MacBook isn't that different from purchasing a phone). A time where viruses and bugs are a thing of thing of the past. A time that has been expected to arrive for almost 20 years since Linus Torvalds launched Linux.

Aah! That hit the spot.

While a lot may have changed over the period– Linux is easier to use now, a heck of a lot more reliable and drivers are not that much of a problem– the Year of Linux is yet to arrive. With every major release since 1995, fans and experts alike have warned of days where the said distro was the One.

It was as early as 1995 that we started dubbing said year as 'The Year'; starting with Slackware which was released in '92 and gained popularity. Debian, expected to fail at first, was also among the list of honourable mentions. Especially among the early releases.

More recent ones include 2004, with the release of Ubuntu. 2005, with the release of SLED (technically making it the year of Linux for businesses). 2007, when Dell started releasing machines with Ubuntu as the default OS. 2008 was actually a missed chance for Linux. Netbooks were coming into fashion and Microsoft had just released a travesty of a product, popularly known as Vista. But the distros that came bundled with the machines left a lot to be desired and Windows 7 hit the streets in beta the next year.



Note to self: Don't forget the cute mascot

Before we delve in to the specifics of why that year is yet to come, let's take a moment to explain to the some important basics to the uninitiated.

## Why Linux is so awesome

### 1. It's ready from the start

This might come as a surprise to many, but Linux (depending on the version you're using of course) can actually be a better package than Windows for out-of-the-box performance. While Windows itself does come with some basic apps pre-installed, distros like Ubuntu come with a whole bundle of free and powerful productivity apps that are bundled as part of the OS. You get things like a full-fledged office suite (OpenOffice or LibreOffice), a powerful photo editor (like Gimp) and an assortment of other apps. Windows will give you notepad and Wordpad, Paint and Internet Explorer.

It's not that there aren't basic versions of Linux or that you can't install an app of your choice on Windows, but for a novice, a distro like Ubuntu does seem to offer much more.

### 2. It drives itself

As long-term Windows users, you must have encountered situations where you're left scrounging around for drivers and cursing the fact that you don't have a DVD drive or that your LAN drivers aren't working. Given Linux's reputation for being an OS for "geeks" developers have worked very hard to simplify the installation process, providing support for a very large number of components by default. More often that not, you'll find a popular Linux distro working perfectly directly after installation with no running around for drivers and other tools. We're definitely not saying that Windows doesn't support more hardware, we're just saying that Linux is more user-friendly than most people think it is.

### 3. It's a steal

If you want to buy an original copy of Windows, be prepared to fork over a lot of money. If you want to run Mac OS X, be prepared to fork over a small fortune. Linux on the other hand is available through multiple sources and a sizeable chunk of what's out there is free. Maintaining one such distro and getting support isn't too hard and you're always assured support from some knowledgeable geek or the other.

### 4. There's a distro for everything

The sheer variety of Linux distros available to everyone is staggering. As a consequence of this variety, you're assured of a distro for every type of PC you use, be it a 10-year old one powered by a Pentium II or a blazing fast, i7 powered monster. You don't need to worry about upgrading your RAM or about support for aging hardware. There are distros that will run on 32MB of RAM and ones that'll make the most of a Xeon powered workstation. No other OS can offer this degree of flexibility.

Linux: Safe from everything. Includes cute penguins

### 5. It's fully customisable

With an OS like Windows or Mac OS, you're stuck with what you get. There's a limited degree of customisability available of course, and the more brave among you can even go for shell-replacement, but none of the aforementioned operating systems can hold a candle to the customisation that Linux offers. Everything from the kernel upwards can be completely customised to suit your exact needs.

### 6. It's super secure

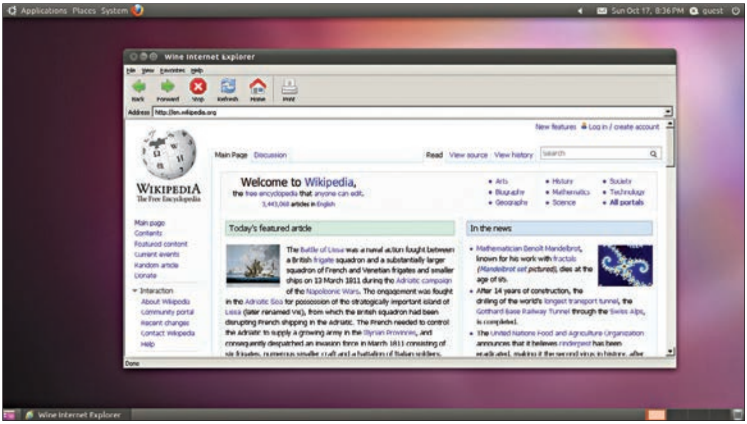
Given the design of Linux, it's inherently a lot more secure. It's not that Windows and OS X are less secure on an absolute scale, both Microsoft and Apple put in a lot of effort to make their OS more secure of course, but given that Linux is also open-source, a lot more people have looked at the code and a lot more people have worked on the kinks. One can argue that hackers will also have access to the kernel, but it's not that easy to crack Linux and that's one of the reasons so many servers and secure installations rely on Linux as their primary OS.

## What's taking so long?

Seeing that Linux is so awesome, you might be wondering what's been holding it back. For starters, a lot of people still think it's not as easy to use as Windows. While this may have been true at some point, those days are long gone (think years). Here are the top reasons that have been keeping Linux from reaching its potential.

### 1. You can't run most software

A myth that's stood the test of time with no apparent justification. Not only



Wine – in development since 1993. It gets better with time do several organizations offer Linux compatible software, the open source community has also done enough to keep you and your copy of Linux relevant. Photoshop can be replaced by Gimp, Corel Draw by Inkscape, MS Office by Open Office and Libre Office. The list is seemingly endless and can be found at osalt.com and opensourcealternative.org. When you factor in the "cloud", software seems less and less relevant.

### 2. The alternatives are not as good as the original

While some amount of validity can been seen in the above argument, the counter argument is Wine. Wine is a compatibility layer that easily allows users to run Windows compatible programs on Linux based OSes. Wine stands for Wine Is Not an Emulator and works by translating the commands on the fly instead of simulating Windows logic. Wine is used not only on computers but also even in synthesisers.

### 3. Windows is more widely available

Microsoft largely ensures that computer manufacturers distribute copies of Windows with their machines. Some sources say that Microsoft sells copies to manufactures are almost a tenth of the price it charges customers. Microsoft and Apple also aggressively meet offices and educational institutions and get them to use their products. But the fact that Linux is clearly the more cost effective option can be seen very clearly seen in developing nations in Africa and Asia where it is slowly but surely gaining traction.

### 4. Confused by choice

Simply put, there are too many iterations of freely distributable Linux. While each one has its own purpose and use, the annoying part is that they're not all compatible with each other. Even though they're all Linux, a program meant for Red Hat won't work on Debian and vice versa.

Powering devices soon

### 5. Gaming

While gaming isn't the biggest reason people use computers, whether or not it runs games is a deciding factor when say, a family buys a computer. The fact that many titles weren't made for Linux was a big reason why the number of people who grew up with Linux are few and far between. Fortunately game developer Valve is trying to fix that through

Steam and the Steam OS (you can read about it here *http://dgit.in/XAQDth* ).

### 6. Drivers were a pain

While the more recent distros come pre-packed with essential drivers, in its early to mid years, finding compatible drivers was the hardest thing on Linux. Manufacturers would simply not share the drivers' kernels for a long time. As recent as 2012, NVIDIA was famously 'flipped off' by Linus Torvalds because the tech giant wasn't extending adequate support.

## Is Linux already here?

Taking in all the info we just shared about where Linux stands today, if you can't help but get the feeling that Linux is probably living a life incognito, you're right. Hidden in plain sight, Linux is in more places that you would believe. The combination of low requirements and cost effectiveness is enough for Linux to be a winner. Here are all the places you're actually seeing Linux at work.

### 1. Servers

While Linux may not be raking in the Benjamins (or the Gandhijis) on the civil computer market, they're doing rather well in the server market. While Windows is still on top, Linux has been showing better growth figures. Linux seems to be the perfect package. It's cheaper, more stable, safer, goes easy on the hardware and gives you the flexibility to make changes in the code.

### 2. All Things Google

If you like to search for things on the internet, the chances of you using anything apart from Google are slim. The only way you're not using Google is you're looking for things on Facebook (Bing) or if you unwittingly left a box checked/unchecked while updating Java or your antivirus. If you're using Google, you're using Linux by association. Google's go to OS is a "light skin over the regular Ubuntu," named Goobuntu. In fact, even Google's servers run Linux.

One synth to rule them all

### 3. More Things Google

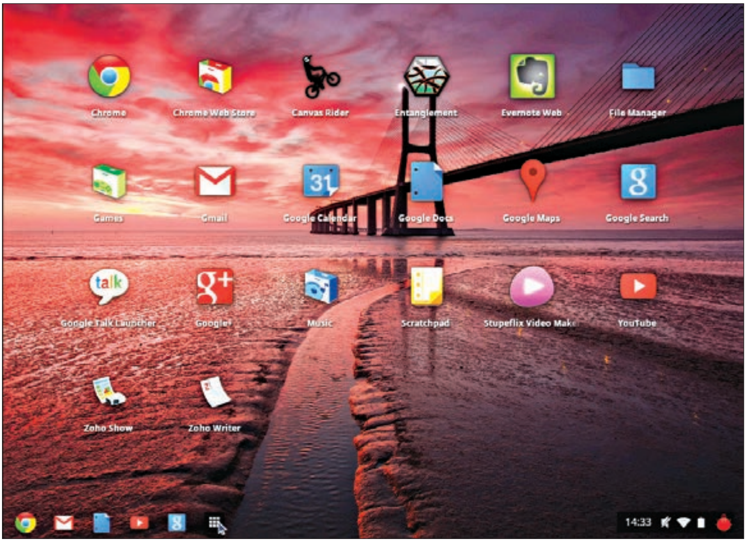
Google's two biggest operating systems are Android and Chrome. And surprise, surprise, they're both Linux-based too. Based on the Linux kernel, Android has revolutionised what Apple had kick-started so many years ago. As of today (Aug 2014), Android is top dog. Chromebooks are also catching on and last year they apparently outsold MacBook's on Amazon.

### 4.Routers and Set Top Boxes.

While it may not be apparent, chances are, your high-end set top box is probably running Linux. It's hidden deep inside because frankly, you don't need it, but Linux is still Linux. If you own a router made by D-Link, Buffalo, Linksys, Asus and a few other manufacturers, you're probably using Linux there too.

### 5. Audio Synthesisers

A final place where you may not have expected to find Linux lurking in the depths is in music. Companies like Korg, a behemoth in the professional audio market and Muse Research have developed products named Kronos and the Receptor, which are based on the Linux kernel. While the Kronos is a full-blown workstation allowing you play, mix, sample, add effects and make dinner from the device itself. Ok, maybe it won't do that last bit but it's still pretty impressive.



What your business needs

## Is it closer than we think?

With Linux having made its case across markets, this really makes us wonder whether the aforementioned 'Year of Linux' is already here. A time where a majority of all the machines run an OS based on the Linux kernel isn't that hard to imagine. After all, Google uses Linux and they're doing just fine. The android phone that's in the hands of hundreds of millions of people is doing fine and so are the chunk of Linux based servers the websites you frequent are hosted on.

College, here I come

When you throw in Chrome OS, Google Apps and the fact that between the two, you can replace your proprietary OS and software on a hardware platform that needn't be very powerful, you can develop a system that's capable of handling all the tasks an average student or office worker needs. Why would you need a proprietary OS and apps in such a situation?

What's really holding Linux back, in the consumer space, is a lack of knowledge of its capabilities and the potential of the platform. All it takes is for a few of you to jump into the deep end and experience Linux for what it is. You might flounder for a bit but there will be a million arms ready to keep you afloat if only you ask for assistance. You'll be surprised by the result.

Is 2014 really the year of Linux?' The short answer to which is 'No, let's ask again in 2015.' d

## CHAPTER #03

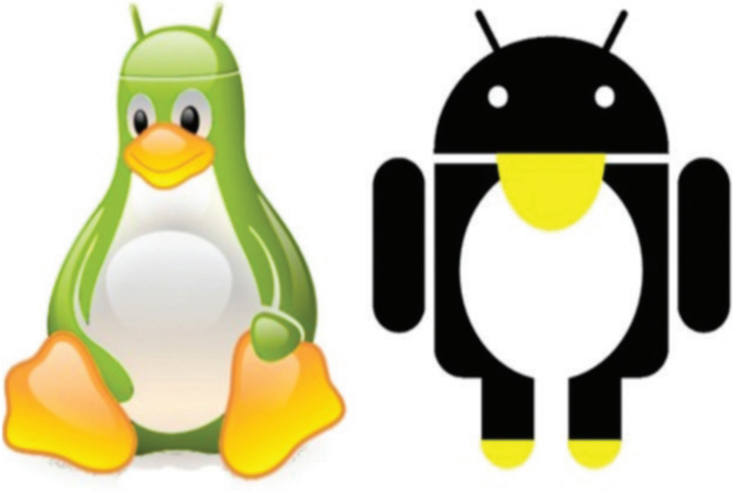
# LEADERS OF CHANGE

Every war needs pioneering Generals. Meet them here.

### Google

Google has, for all intents and purposes, been one of the greatest agents of change. Android, overwhelmingly the world's favorite mobile operating system (by the numbers), is based off the Linux Kernel and this has given the platform exposure to an unprecedented number of users. Now, a lot of people do complain that what Google ships out isn't really Linux, but that isn't even remotely true. Yes, the architecture is very different from traditional distros, but considering what Google wanted to do with the platform, it was a valid step to take.

A big benefactor to the Linux family



Blurring the lines between proprietary and open

Android may be based on Linux, but it's not based on the type of Linux system you may have used on your PC. You can't run Android apps on a typical Linux distributions and you can't run the Linux programs you're familiar with on Android. While Linux does make up the core of Android, Google hasn't added all the typical software and libraries you'd find on a Linux distribution like Ubuntu.

ChromeOS is to Linux what OS X is to BSD. In other words, it's a forked operating system that uses the Linux kernel under the hood. Much of the operating system is made up of Google's own proprietary blend of code and software. So while ChromeOS is using the Linux kernel under its hood, it's still very different from what we might find with today's modern Linux distributions. Where ChromeOS's difference becomes most apparent, however, is in the apps it offers the end user: Web applications. Exclusively. With everything being launched from a browser window, Linux users might find using ChromeOS to be a bit vanilla. But for non-Linux users, the experience is not all that different than what they may have on their old PCs. Anyone who is living a Google-centric lifestyle on Windows will feel right at home on ChromeOS. Odds are this guy is already relying on the Chrome browser, Google Drive and Gmail almost exclusively.

The big difference here comes down to what we mean by Linux. People use the term "Linux" to mean many different things. At the most basic level, Linux means the Linux kernel. A kernel is the core of any operating system. But the confusion stems from the fact that most people also refer to Linux distributions as simply "Linux." However, Linux distributions aren't just the Linux kernel. They contain many other pieces of software, and although it is exactly the same kernel that runs under all the different distros that you find today, the software the they build over it is what gives the distro its own identity.

Going by that definition, Android, and indeed, ChromeOS, fit perfectly well into the definition of a Linux distribution, that are admittedly niche in their reach and purpose, but are still Linux distributions nonetheless. Because Linux is open-source, Google's Android developers could modify the Linux kernel to fit their needs. Linux gives Android developers a pre-built, already maintained operating system kernel to start with so they don't have to write their own kernel. This is the way many different devices are built– for example, the PlayStation 4 uses the open-source FreeBSD kernel, while the Xbox One uses the Windows NT kernel found in modern versions of Windows. Google is a big fan of the Linux way of doing things and this reflects in the internal workings of the company. 'Goobuntu' is an internal Linux distribution that they have built on top of, you guessed it, Ubuntu.

A major accusation labelled against any corporation that backs an open source project is that they serve themselves above everything else. True as that may be, we do not see how it is a negative. Google, has basically added the parts that were needed to have the kernel run on mobile devices. Years before this, other vendors were faciong great difficulty in making Linux run efficiently on mobile devices, even laptops. Anybody looking for a way now would find a great guide in the way that code is implemented in the Android Open Source Project.

As informed consumers, we need to understand that corporations do not have a heart or a soul, but they do have a balance sheet to maintain. If their purpose is solved by taking a public project forward, or even tangentially into a direction it has not gone before, we should be happy for it, because that paves the way for any that follow them to have a ready blueprint to see how that very particular problem is to be solved. Issac Newton once claimed that the reason he was able to see far ahead in science is because he stood on the shoulders of giants. This is how mankind has always progressed through the ages– gradual development, one on top of the other, until eventually, something great is made.

## Canonical

'This is an ambitious project' is one of the first realizations that come to mind when one takes a look at what is probably the brightest beacon for Linux. Bug #1 on their bug tracker was opened to note that Windows had a greater share of market (and, by extension, users) under its umbrella. Whatever be your preference when it comes to choosing your operating system, it is Mark Shuttleworth (the guy who gave the world Ubuntu) and his description of the problem that make for a very telling read for a bug that was filed almost exactly 10 years ago today.

Canonical has been impressive in the way that it has started to make serious headway with manufacturers (with Linux) in being installed with

### Mark Shuttleworth says:

Microsoft has a majority market share in the new desktop PC marketplace. This is a bug which Ubuntu and other projects are meant to fix. As the philosophy of the Ubuntu Project states, "Our work is driven by a belief that software should be free and accessible to all."

"Ubuntu software is free. Always was, always will be. Free software gives everyone the freedom to use it however they want and share with whoever they like. This freedom has huge benefits. At one end of the spectrum it enables the Ubuntu community to grow and share its collective experience and expertise to continually improve all things Ubuntu. At the other, we are able to give access to essential software for those who couldn't otherwise afford it – an advantage that's keenly felt by individuals and organisations all over the world."

Non-free software leaves users at the mercy of the software owner and concentrates control over the technology which powers our society into the hands of a few. Additionally, proprietary software stifles innovation, maintains artificial scarcities, and enables malicious anti-features such as DRM, surveillance, and other monopolistic practices.

This bug is widely evident in the PC industry.

Steps to repeat:

1. Visit a local PC store.
2. Attempt to buy a machine without any proprietary software.

**WHAT HAPPENS:**

Almost always, a majority of PCs for sale have Microsoft Windows pre-installed. In the rare cases that they come with a GNU/Linux operating system or no operating system at all, the drivers and BIOS may be proprietary.

**WHAT SHOULD HAPPEN:**

A majority of the PCs for sale should include only free software.

CANONICAL™

Canonical's success proves that an open source project can be run as a company, and do well

OEM status on machines, giving it exposure to a decidedly greater audience. Of course, with most people never really changing their operating system, this has the potential to serve up a lot of long time consumers. But the most impressive thing is, people have not been complaining about it. Very few have come out and discredited the move, which is quite a big deal for canonical.

Canonical has been working very hard to push the adoption of Linux wherever it can and it's heartening to see that their efforts have not been in vain. Just the fact that Linux is slowly getting more prevalent among consumers is in itself a great achievement. Their vision of a free, Linux-powered world is still a vision, but if their success so far is anything to go by, they might actually succeed, eventually.

## Amazon

We are not here to discuss the contributions of companies to take Linux forward, we want to know what they did to get it to you. And on that front, there is an absolute requirement to mention the Kindle family of devices. It

amazon.com®

The e-commerce giant plays a big role, some in front of the curtain, but most of it behind has proliferated a very narrow and well defined area of consumer interest, and made itself the de-facto standard for it.

Of course, having come from a provider with a massive library of content, some say that anything they chose would have been successful in that regard. But heresay does not stand a chance against raw numbers, and the fact of the matter is that the entire line of Kindle devices– tablets and the phone– run on Android and thus, by extension, the Linux kernel.

Amazon Web Services: powering almost every other site

More important than the Kindle family though is Amazon's Web Service (AWS), a service that's permeated the world of cloud computing services and is almost de-facto and the entire enterprise is powered by Linux. It's a service that's brought the power of the cloud to innumerable startups and enterprises and allowed them to comfortably migrate their infrastructure. You may not realise it now, but many of the apps, services and even websites that you visited are in some way dependant on Amazon's Linux powered AWS.

## Microsoft

Here is something we bet you weren't expecting to see. Microsoft is one name that is probably synonymous with the anti-Linux bandwagon, to the point that this particular bandwagon looks like a one man show. Or at least it used to. People unfamiliar with the new Microsoft would probably baulk at the shift in paradigm that the company has gone through in the previous few years, none more so than ourselves. But one place where the change has been very limited is the company policy on the penguin. It has been no secret that Microsoft is not the greatest fan of the open-source world in general. But for what it's worth, they seem to have softened, at least a bit, with the last change at the helm in leadership. Satya Nadella, a

Microsoft

Toning down the animosity

man who finds his roots working with UNIX based software, has come in, and if nothing else, toned down the aggressive manner in which MS went after, well, anything non-MS.

We can also see baby steps being taken to be a more open and likable as a company. The source code for parts of the first version of the Microsoft office were recently released to the public, admittedly under a very limited license, which is in general a very non-Microsoft way of doing things. Their cloud computing platform, Azure, has introduced Linux instances in public beta, which means they have finally taken note of the fact that being in the IaaS business with no Linux offerings is probably not the smartest decision. Over on the consumer side, they shocked the world when Skype came out for Linux in 2012, and thankfully, that was one of the many little improvements that they have started to show.

These are baby steps, yes. But surely, the future of Linux is that little bit brighter.

CHAPTER #04

# LINUX ON THE DESKTOP TODAY

## Come for the price, stay for the perks!

As a consumer yourself, the fact that we (as digit) are pitching something so vigorously should (and we hope it would) make you wonder how you can get your hands on such a product. If that is indeed the case, you are in great luck! Linux, the free for all bonanza that probably powers almost the entire world's macroscopic digital ecosystem, is exactly that– free for all. But before you dive into that, you should probably take a look at your options and get a feel of what you're getting into. This right here, is the state of Linux on the desktop– summer of 2014.

If you're at all curious about your computer, and let's face it– you reading this piece means that you are– you have probably dabbled with installing a distro before, if only to get a feel for what the fuss is about. If that was any earlier than 2012, we are happy to report that there are wholesome changes that await you. Linux has gone through a great overhaul, and has finally come into its own in competing to be the operating system of choice for the masses. Instead of making you go through the same old boring list of distro choices, let us walk through the needs of the average user, and see how they are catered to in the family of Linux flavours out there.

“It looks like Linux is finally finding its feet here”

Hashing out the major needs that someone may demand from a machine that they will probably spend the majority of their waking time with, we start with the fun part first– gaming.

## Gaming on Linux

Oh yes, the absolute pet peeve of the detractors against the penguin over the years, gaming. If you’re anything like us, any operating system that does not let you play is not one worth using. Thankfully, that is something that has been understood pretty well by the industry and we are now starting to see the fruits of some of that insight.

A Synonym for games in the world today, Steam is now on Linux

Before we get into all the goodness that awaits you in this domain, let us take a moment to remember the roots. When you take look at what is probably the world's first true 'game' in the spirit of what we expect today– Doom– it actually shipped with a Linux binary. Do not confuse it with a more open attitude towards the platform at the time, the developer who ported it over from other commercial versions actually wrote his thoughts about it in the Readme (the one that no one ever reads, yes) about the whole thing. He said:

*"I did this because Linux gave me a woody. Please don't call or write us with bug reports. They cost us money, and I sorta get ragged on for wasting my time on UNIX ports anyway"*

*Dave Taylor*

What we wouldn't do for a good game on this platform

Gaming on Linux systems has really gone up multiple notches over the course of the last few years, particularly so when Canonical finally started to focus on being something more than the easiest entry point to the world of non-Windows based computing. The efforts of Mark Shuttleworth and the team bore fruit as Steam (absolutely, that lovely beast of a gaming platform) decided that it was time that they started supporting the ignored terrain of gaming on Ubuntu. So much so, that at the time of writing, Steam only supports 'Ubuntu' in particular, and not the Linux family of operating systems. Still, it's a step in the right direction. And has really been executed to make sure that the users on this third platform do not feel like second class citizens when it comes to treatment from game developers. Some of the A-list games that are popular on other platforms such as:

- Counter Strike,
- Counter Strike: Source,
- Team Fortress 2,
- Half Life,

are, at the time of writing, available for Linux as well.

<3 <3 <3

But the thing is, this is not where it ends for Valve and their Linux adventure. Ever since they introduced a gaming mode for the Steam application, they've been aiming to be the de-facto leading provider for living-room entertainment, something that is in the domain of, you guessed it, gaming consoles. So what is the best thing for a company to do when it needs to compete in a market full of proprietary consoles? It kicks off a platform of its own– the Steam Machines.

Steam Machines will be a little different as compared to the run-of-the-mill consoles that you see on the shelves today. First-off, they will not be single manufacturer made devices. Instead, the whole concept is based on a set of recommended hardware configurations that manufacturers can fiddle with and tweak. You're essentially getting a PC into the living room and that PC is now rated on a pre-determined scale. With SteamOS, these Steam Machines are a sort of crossover between HTPCs and gaming consoles, this is a move that if done right, could easily make a huge impact on the entire industry and bridge the divide that currently separates the console and PC master races.

## Regular usage

Another point of contention for people who visited Linux-land from their

For many people, this is all they really care about

Windows-abodes was the incredibly different layout of things that they had gotten used to. The way to do anything, and we're not kidding that you can literally do anything with Linux, is very, very specific. Or rather, was. Recently, most distros have begun to realize that and have worked to simplify things.

A Linux distro can be transformed into a most beautiful and functional piece of art that will send most nerds into nerdgasms and send you into a fit of digital ecstasy that you'll be hard-pressed to recover from. But here's the catch, the fact that the architecture allowed such customisation meant that many developers didn't think to spend much effort on UI, assuming that the nerds would do it anyway. Unfortunately, that's not how most people use their PCs..

For a vast majority of the computer users, the OS is a means to an end. They want to accomplish something, and that something can be done in

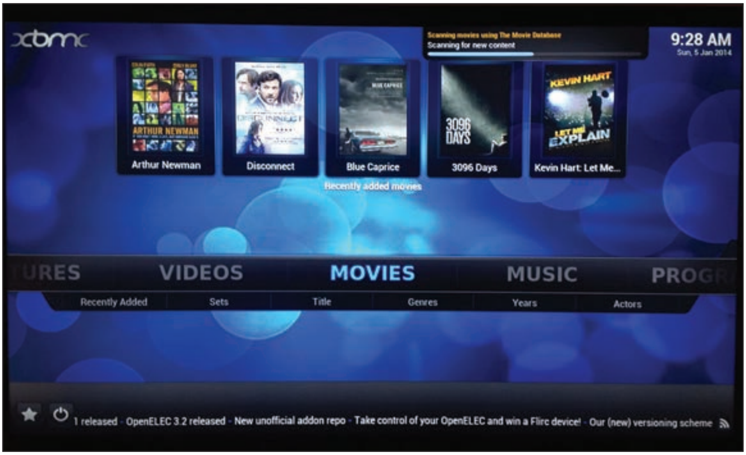
The great opinion divider: only time will tell if was visionary or foolish to use it some specific way using a computer. It's these kinds of users that Linux has failed to entice, until now. Accomplishing things for the average Joe is not the most intuitive of tasks in most Linux distros. Which is why Joe thinks 'you get what you pay for', and happily goes out and buys (or doesn't, we know you Joes very well) a Mac or a copy of Windows. But the gist of the matter is that Joe was not impressed by what he saw. That should be changing right about now, with teams dedicating considerable resources to achieving in aesthetics the level that they are at in the underlying tech. Some of the most notable examples include "elementary OS"– the latest rave among the hacker crowd, or even the redesigned Ubuntu which now runs on its own front-end of the Unity interface. These changes have not gone down well with those who already knew what they were doing when they entered the command line, but the general public perception has most certainly improved for these decisions.

Catering to an audience that is so used to hand-holding that they don't know anything else is something of an unchartered territory for most of these 'open' platforms. But the forays made in this regard by the frontrunners such as Ubuntu, Mint, openSUSE and their ilk have been admirable. Another great thing to see is that the community of developers at large are starting to come to terms with the fact that users don't want a hatful of features that they can tune to their heart's delight– they want something that just works. Something that when plugged in, does what needs to be done and gets out of your way in doing so. You cannot fault the earlier versions of distros for not taking this approach– they've only just started going after mass-market popularity. The days when it mattered what kernel version you're using underneath are pretty much over. Sure, you can go into the settings menu and see the kernel version, but how many users really care? And the thing is, users generally shouldn't care. They really shouldn't care what operating system they're running, they should care about the work they get done. The operating system should not only be invisible, but pretty much irrelevant to the average user.

## Entertainment

Ah, yes, a part of the small set of things that Linux still does best among all the other OS choices out there. Owing to the presence of bundles of dedicated HTPC software that are freely available for Linux, it is possible for you to tranform your machine into a fully featured, powerful beast of an entertainment entity for free. The only problem is that most of you don't know if/how this can be done. The multitude of media centers that are provided for this platform dwarf any other platform by a mile. But the fact that they still do not get mas adoption is wrong and yet, understandable. In an industry that operates at scales of billions of dollars, it's probably hard to make a dent without a consolidated marketing team/budget.

There's a good chance that you have never had a taste of the options that Linux has to offer in terms of the entertainment options out there, such as XBMC (recently re-christened to Kodi), GeeXboX, OpenELEC or their ilk. But that's okay, because there has never really been a push for adoption of 'real' Linux on home theaters, until very recently. We now see major players trying their hands at taking over your living room. As an example, Ubuntu TV comes to mind as a recent entrant into the race. And as a corollary to the statements that we just made about the rising popularity of the lovable tux, we present the evidence that ramifications can be seen in the corporate world– the one sureshot sign that there is definitely some fire under all that smoke. It was recently announced that Ubuntu TV's been acquired by Samsung, presumably in order to be installed on the latest generation of Smart TVs to make them… er… smarter.

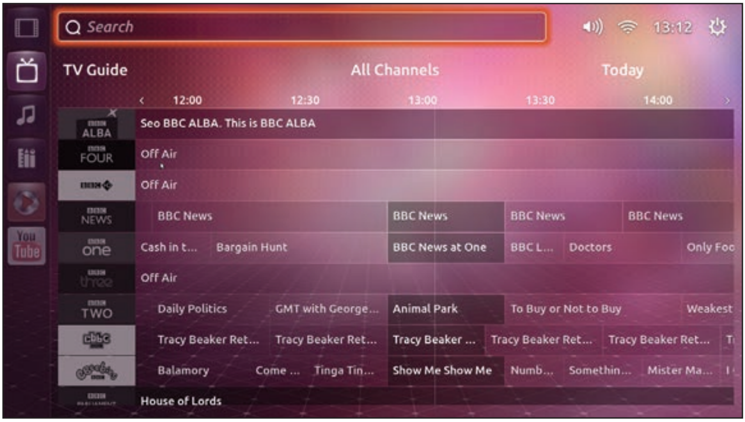


Scanning movies using The Movie Database
Scanning for new content

1 released - OpenELEC 3.2 released - New unofficial addon repo - Take control of your OpenELEC and win a Flirc device! - Our (new) versioning scheme

Can this be the future of the living room?

As our devices hog more and more computing power, it has become possible for a single operating system to encompass everything that you touch



Ubuntu is coming to the TV!

over the course of your regular day. From your work to your home, your laptop to your smartphone to your TV– Linux can now run on anything and they are making a good competitor in this race against giants such as Google (partially, because they are almost an ally), Microsoft and Apple. The best part if you ask us? It's truly holding its own!

## Office Work

Office suites are the quintessential productivity apps and they come in all shapes and sizes. You'll find them in every general purpose Linux distro – from full-blown desktop distros like Ubuntu, to miniscule ones such as Puppy Linux (yes, the one that lies at the core of ChromeOS).

Like it or not, for most of us Microsoft Office was our first encounter with an office suite. And that is not a bad thing– it's still easily the best productivity suite out there, all things considered. But there are two major problems in using it with Linux:

- It's neither free nor open, and perhaps more importantly,
- It's not available for Linux

Now we know that the first problem is really just a morals issue and the second one is not that hard to get around using emulators like Wine. But we are pitching Linux as your lone computing solution here– and solutions involving duct-tapey measures are not what you want from something that you are going to be using everyday. While it's easy for those used to one of the open source office suites to switch to another, those used to Microsoft Office are more likely to switch if the user interface of the new suite feels familiar

LibreOffice
The Document Foundation

The open source challenger

to what they're used to. Similarly, the replacement office suite's support for proprietary formats is also a must. More so in a business environment that will be exchanging files with users of proprietary office suites.

One of the the most powerful and popular suites in this regard is LibreOffice, which comes pre-installed with most Linux-based systems today. Started off by a breakaway team from the OpenOffice.org project, the progress that's been made by these groups of people in what is a relatively short time for desktop applications is remarkable. LibreOffice is one of the most comprehensive suites out there. Almost every LibreOffice app has easy-to-navigate wizards and templates to help you create all sorts of documents. To ease interoperability, the suite supports a large number of proprietary formats, from Microsoft 97 to Microsoft 2010, and can export files to PDF as well. It can automatically hook up with the default email client so that you can email documents from within the app. You can further extend the suite by adding extensions from the online catalogue. However, it's the bulkiest suite in the roundup and requires a well-stocked system to perform well. Although dependant on Java, it works flawlessly with the open source OpenJDK platform.

LibreOffice Writer has several wizards to help you get started with creating a document. It's also got a document converter for converting documents in Microsoft Word's legacy formats (.doc, .xls, and .ppt) into its open document equivalent. Writer lets you add blocks of text, called sections, which can then be protected against changes, be hidden, and converted back to normal text. It has pre-defined column layouts, and lets you create your own. It's also designed to ease working with long documents with features such as the navigator.

Calc has lots of wizards to help you use its advanced functions. It can also download templates from the LibreOffice template repository, and can pull in data from databases. It has an 'intelligent sum' button that inserts a sum function or sub-total automatically. Unlike other apps in the

The all encompassing solution

LibreOffice suite, Calc lets you collaborate with other users. It has a mechanism for managing data entered by several users and lets the owner integrate this data into the spreadsheet.

If you have continuous access to the internet, then there's always Google Docs, which is fast becoming reliable and powerful in equal measure as time goes by and new features are introduced. Google Docs is more advanced than a simple text editor, but has no advanced features. It includes many predefined templates and lets you insert tables.

Its research tool makes use of its online nature, allowing you to search for topics using Google search. You can drag and drop elements from the results into the document, and a citation is added automatically. The interface is a familiar one, and above all, it's completely hassle free. On browsers other than Google Chrome, the service gives a warning that some features might not work, but we didn't have any troubles using the service on Firefox. The apps don't have a Save button, and automatically save changes, which is a plus. Some of its apps, such as Docs and the spreadsheet, let you download the file in open document format, while others, such as the presentation app, only allow proprietary formats. You can also easily upload your offline documents as well. This is the direction that most services are moving towards, and unless you are a power user on the move, there is no reason to not use a cloud-based suite over anything else.

# GETTING UNDER THE HOOD

Now it's time to get your hands dirty. Read on as we walk you through the install process, the various GUI options and some Command Line wizardry.

You've read about how Linux is making massive strides in nearly every sphere of computing, from supercomputers and servers to embedded devices and smartphones, and you've read about how this might just be the "Year of the Linux Desktop". Hopefully we've convinced you to give Linux another shot, and in this chapter we're going to tell you exactly how.

Most Linux distributions come in the form of a Live disk - either a CD/DVD or an image on a pen drive that can be booted off. You can experience the Operating System first-hand without making any changes to your hard drive, whatsoever. You can browse the web, access documents and media files on your hard drive, install applications, perform some configuration and generally fool around with the knowledge that your primary OS lies secure and untouched. Once you've convinced yourself that it's the best possible flavour of Linux for your use, you can go ahead and install a permanent copy of the Operating System onto your disk, either alongside your existing OS (called a dual-boot scenario) or replacing your current OS. Either way, the steps remain the same, and in the end you should have a fresh Linux distro ready to fiddle around with.

If you've installed Linux before, don't worry, the steps remain largely the same. If you remember from the last time you went shopping for the 'right' distribution, you'll remember that you had to make a lot of choices, particularly regarding the nature of the graphical interface you'd be using. The task of drawing the windows, toolbars, mouse pointer and other interface elements you interact with is given to a program called a Window Manager. There are mainly two types of Window Managers - Tiling WMs and Floating WMs. Tiling Window Managers don't allow application windows to overlap, but continually split the the available space into smaller and smaller portions, allowing you to view them all at once. These are typically lighter in terms of system resources used, and are tailored for keyboard-based navigation. Floating WMs are more familiar to Windows/ OS X users (since the default WM on these systems is a floating one) and allow you to freely resize, minimize and maximize windows. These might be more memory intensive, but are considered easier to use and require almost no configuration, besides being more familiar to most.

A Desktop Environment is a combination of a Window Manager along with some pre-configured defaults, a brief selection of applications and some UI elements like desktop icons, widgets and wallpapers. While there are thousands of Linux distributions out there to choose from, a lot of them are just a combinations of package managers (the tool you use to install/ remove software) and desktop environments. We'll help you pick out a Desktop Environment based on your use case, and leave the other half to you– package managers are largely a personal preference.

## I. Installation

Installing Linux on any modern computer is really easy, but it's easy to get overwhelmed by the choices available. There's an almost intimidating level of choice when it comes to Linux distributions and the desktop environments they ships with– why, sometimes the same distribution will have several different flavours or 'spins' (We're looking at you, Ubuntu), but if you're new to the whole process, we suggest we you stick with Ubuntu.

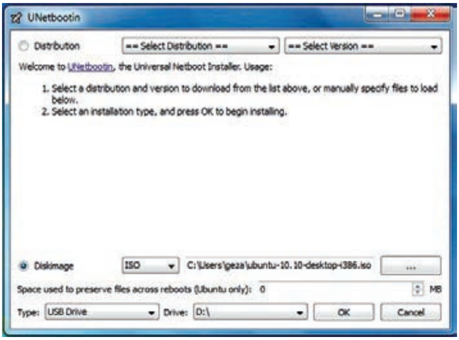
Ubuntu is fairly standard, with a huge community supporting it, receives regular updates every six months, is stable enough for daily use, has the largest selection of software (including Steam games) and most importantly, focuses on ease of use above all else. Ubuntu has a lot of flavours that rebundle the 'stock' Ubuntu experience with a different user interface (including the popular Linux Mint), but they're all equivalent on a technical level. For the same reason, this installation guide will use Ubuntu as an example. If you have some experience with Linux, feel free to experiment with some of the more 'advanced' options out there like Arch Linux, Gentoo and Debian.

If you're not entirely sure about installing a new Operating System on your hard drive, or you don't want to void your manufacturer's warranty by partitioning your hard drive, you can always install it within a Virtual Machine. Both VirtualBox (*http://dgit.in/ftVirtualBox)* and VMWare (*http://dgit.in/ftVMWare)* allow you to run Linux as a Guest on either a Windows or an OS X host. The install process is nearly identical, with the obvious exception that you won't need to partition your hard drive or even create an installation disc. Skip to Step 2. if you intend on installing Linux in a Virtual Machine.

## 1. Prepare the install media

Download the latest release of Ubuntu, version 14.04, codenamed Trusty Tahr, from the website - *http://dgit.in/ftUbuntuDownload.* If your connection permits, download using the torrent file using a BitTorrent client - not only will you ease the load on Ubuntu's servers, but your download will probably finish faster. If your system supports 64 bit Operating Systems, download the corresponding image, else go for the 32 bit version.

Once you have the ISO image, you'll need to either burn it to a CD/DVD or a USB drive. For the latter, use a program called Unetbootin (*http://dgit.in/ftUnetbootin)* available on both Mac and Windows, or Linux Live USB Creator (*http://dgit.in/*



Welcome to UNetbootin, the Universal Netboot Installer. Usage:

1. Select a distribution and version to download from the list above, or manually specify files to load below.
2. Select an installation type, and press OK to begin installing.

Diskimage: ISO C:\Users\geza\ubuntu-10.10-desktop-i386.iso

Space used to preserve files across reboots (Ubuntu only): 0 MB

Type: USB Drive

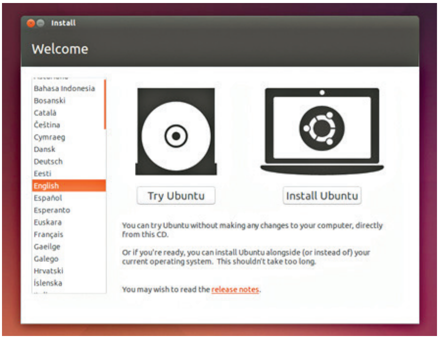
Drive: D:\

Use Unetbootin to prepare a bootable Ubuntu flash drive.

*ftLinuxLiveUSB)* available only on Windows. Choose the correct drive letter for your pen drive (make a mistake and you could end up erasing the wrong drive!) and the location of your ISO file. As another option, you can choose how much space you'd like for any files you create while testing out your Live session (Persistence Space). The files in this space will be preserved across reboots, unlike any other changes made to your Live session, which will be erased when you reboot.

## 2. Boot into your Live session

Insert the installation media you just prepared in Step 1. and boot into it, by pressing either the F2 or the F12 button when your PC boots up. (The exact key will be mentioned on the screen, but it varies depending on the manufacturer). Change the device boot priority so that your PC boots up using the CD/Pen Drive instead of the hard disk. Once the PC reboots and the dialog box pops up, choose 'Try Ubuntu' instead of 'Install Ubuntu' and step into your Live session.



You can try Ubuntu without making any changes to your computer, directly from this CD.

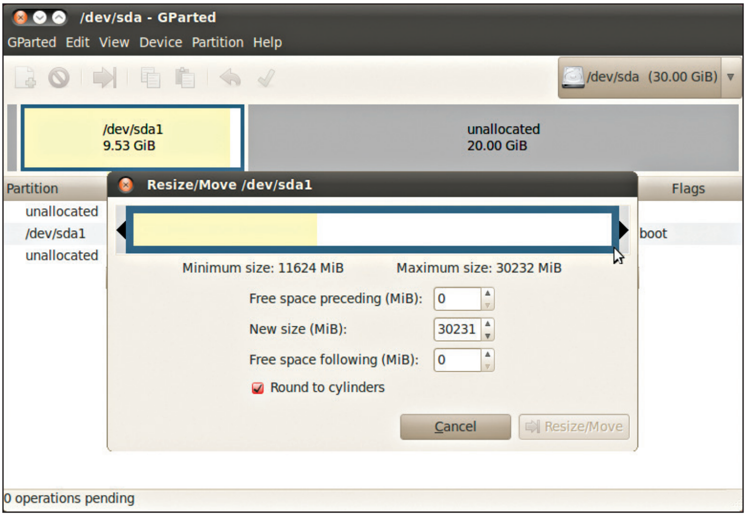
Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.

You may wish to read the release notes.

Choose the 'Try Ubuntu' option to boot into your Live session

## 3. Partition your hard drive

A hard disk is divided into logical divisions called 'partitions'. On Windows, each partition is assigned a letter – for example the C: drive is where the Operating System is installed. Linux needs to be installed on its own partition, using its own filesystem. The partitioning can be done from within the live session itself. In your Ubuntu session, click on the top left corner on the Ubuntu icon. A new screen comes up, called the Unity Dash. In the search box, type 'Gparted' and open this utility. You'll see a list of all the partitions present on your hard drive, along with the partition label, the filesystem type and the free/used space. In order to create a new partition, you'll have to shrink one of the existing ones and create a new one with the unused space.



Minimum size: 11624 MiB
Maximum size: 30232 MiB
Free space preceding (MiB): 0
New size (MiB): 30231
Free space following (MiB): 0
☑ Round to cylinders
0 operations pending

Resize an existing partition to create space for a new, ext4 partition.

To do this:

- Right click on an existing partition which has at least 15GB of free space, and click on Resize/Move. Avoid resizing your C: drive as it could cause trouble with Windows booting.
- Use the slider to adjust the amount the partition will be shrunk by. We suggest having at least 15GB, as this is where your Linux system and applications will reside.
- Right click on the unused space and create a new partition, ensuring that the filesystem type is either ext3 or ext4. (We recommend ext4).

Once your changes have been applied, you'll have a new, empty partition which you can install Linux into. On low-powered systems (with < 2GB of RAM) we suggest making an additional partition for Linux Swap, which is a sort of temporary storage that the OS uses when your RAM usage is high. The steps are identical as above, except for the filesystem type – choose Linux Swap instead of ext4.

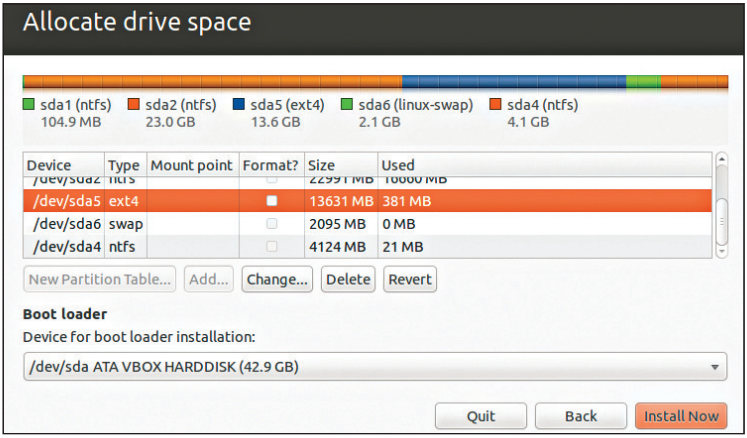
## 4. Install!

Having prepared your computer for Linux, it's time to go ahead with the install. You'll see a shortcut on your desktop in the Live session for the installation, click on it and begin the install. One of the first steps in the install process is connecting to an available Wireless/Wired network. This step is optional, and is used to download any software updates during the install process itself. Ubuntu issues security and stability updates periodically, so it's recommended that you connect to the internet before you proceed.

On the 'Installation Type' screen, choose the third option 'Something Else' as we've already created a new partition. Choose the partition we'd created in Step 3 (you can identify it by the filesystem type - ext3/ext4) and check the 'Use this partition' box. In the Mount Point text field, enter '/' (without the quotes). This is where your entire OS will be installed. Advanced users can create separate partitions for separate mount points– for instance, many users prefer to have their /home directory on a separate partition. Check the 'format this partition' option as well and proceed to the next step.

The installer will now begin to install the OS, and you can go ahead and configure your time zone, create a user account with a password etc. This could take between 15 - 30 minutes depending on the speed of your internet connection. Let the process complete. Once the installer has finished, you'll see a notification telling you that the installation has completed. Restart your computer and boot into your new Operating System!

Once you've logged into your system, feel free to poke around, seeing how different parts of the desktop work. On the top right is the indicator panel, which is similar to the system tray on Windows and houses indicators for your laptop's battery level, network connectivity, clock and Bluetooth. Along the left corner is where you'll find shortcuts to your most used applications



Allocate drive space

🟩 sda1 (ntfs) 104.9 MB
🟧 sda2 (ntfs) 23.0 GB
🟦 sda5 (ext4) 13.6 GB
🟩 sda6 (linux-swap) 2.1 GB
🟧 sda4 (ntfs) 4.1 GB

| Device | Type | Mount point | Format? | Size | Used |
|---|---|---|---|---|---|
| /dev/sda2 | ntfs | | ☐ | 22991 MB | [illegible] |
| /dev/sda5 | ext4 | | ☐ | 13631 MB | 381 MB |
| /dev/sda6 | swap | | ☐ | 2095 MB | 0 MB |
| /dev/sda4 | ntfs | | ☐ | 4124 MB | 21 MB |

**Boot loader**

Device for boot loader installation:

/dev/sda ATA VBOX HARDDISK (42.9 GB)

Choose the ext4 option from the list of partitions on your hard drive.

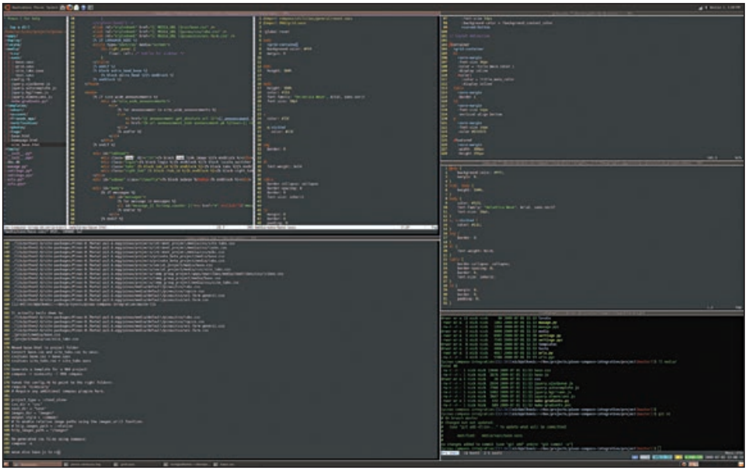
– similar to the dock on OS X or the taskbar on Windows. These shortcuts are completely customizable. The topmost shortcut on the Unity Launcher, as it's called, is for the Ubuntu Dash, which is the focal center of the desktop. From here, you can search for files, applications, documents, music and even items on the web. If you decide to install some additional software (such as the codecs for playing MP3 and DVD files, which aren't included due to licensing constraints), you can do so from the Ubuntu Software Center – a sort of AppStore for Ubuntu apps. Only users with root access can install or remove applications from Ubuntu. Every time you make a change, you'll be asked for your password. It might seem slightly annoying at first, but it's one of the things that makes Linux systems so very secure.

## II. Choices, Choices, Choices

The core idea behind Linux is that of Open Source Software – that which can be freely modified and redistributed by anyone. As a result, ambitious developers who aren't satisfied with what's currently on offer, either fork an existing project or create a new one from scratch. One consequence of this is that Linux users are flooded with many choices – whether it's distributions, graphical interfaces or applications. All of it can be overwhelming to the new user, so we dealt with the first part (Linux distributions) in the previous section on installation. Graphical interfaces is what this part is all about. (We'll deal with applications in the next part, where we give you a complete lowdown on the best Linux alternatives to Windows applications)

The basic building block of graphical interfaces in Linux (and other OSes too) is the Window Manager. As the name suggests, this is the program that is tasked with actually 'drawing' the application windows along with the associated operations like resizing, moving, maximizing etc. The Window Manager works closely with the X.Org display server, an open source implementation of the X Windowing System. Window Managers can be used standalone, or they can be bundled together along with UI chrome like toolbars, window decorations, taskbar/docks, icons, wallpapers etc. into one cohesive unit called a Desktop Environment. Most Desktop Environments will also included a selection of applications and some utilities for customizing the behaviour or appearance of the system. As a result, Desktop Environments are usually more full-fledged and are easier for new users to latch onto, while Window Managers, being focused on slightly more advanced users, give the user unrivaled customizability and a tiny system footprint.

Tiling WMs can be either Floating, Tiling or Dynamic. Floating WMs are those in which windows can overlap one another and can be resized arbitrarily. Windows and OS X ship with such WMs by default, so most users will be familiar with the idea. Tiling Window Managers are those that don't allow windows to overlap with one another. Instead, they opt to partition the desktop into different sized 'tiles' where each tile is occupied by a window. This has its benefits while working on multiple applications simultaneously – for example, a terminal, a text editor, a debugger and a web browser. Another benefit is that these are almost entirely controller via keyboard shortcuts, meaning switching between windows is a lot faster. Dynamic WMs are those which can switch between the two layouts. Awesome, i3 and DWM are some very popular standalone Dynamic Window Managers, though a user must spend some time learning and configuring them in order to become productive.



Xmonad is a popular Tiling Window Manager, useful when multitasking across different applications.

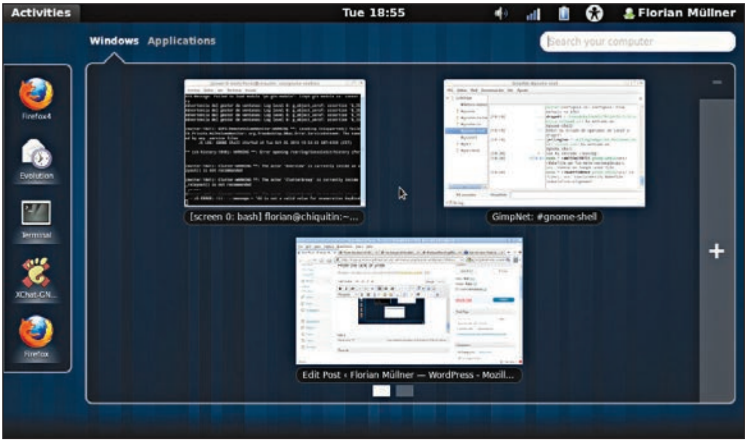
Popular Linux distributions ship with a default Desktop Environment (DE) , while giving you the option of changing it later. Ubuntu, Fedora, Linux Mint etc. come with different 'spins'. Each spin is essentially the same operating system packaged with a different Desktop Environment. For example Ubuntu uses Unity, Kubuntu uses KDE and Xubuntu uses XFCE as the default Desktop Environment and so on. The beauty of offering choice is that it allows older or underpowered PCs to take advantage of the latest and greatest software. As DE's like XFCE and LXDE are tailored to be light on system resources, they require a measly 512MB of RAM to run smoothly. If you'd tried Linux before and are giving it a second shot now, expect to be amazed by the offerings. This particular space has undergone exceptional changes in the last 3-4 years, with developers aiming for a unified computing experience across different screen sizes.

## 1. GNOME

The GNOME project is one of the largest contributors in the Open Source world, and the GNOME desktop environment is admittedly one of the most popular ones out there. The DE actually consists of two distinct desktop interfaces (called shells). The newer GNOME Shell and the older (albeit more mature), GNOME Classic. Both use the same underlying Window Manager – Metacity – and have the same collection of utilities and applications.

GNOME Shell features a bare, touch-optimized look with larger icons, and some innovative desktop paradigms such as the Activities Overview – a way to view all of your open windows at once and access commonly used applications, system-wide search from the desktop (include Wikipedia and Google searches), and an integrated Notification Center which lets you respond to notifications from Instant Messaging or Email clients inline, without leaving your current window. Needless to say, every aspect of the interface is highly themeable, including the icons. Visit *http://dgit.in/GNOMELook* for a large selection of themes, most of which can be edited further as they just use simple CSS. One particularly neat feature of GNOME Shell is the Online Accounts feature which lets you plug your accounts like Google, Facebook, Twitter, Pocket etc. into the OS, which then pulls useful information from these accounts for you. For e.g., the feature automatically indexes your documents in Google Drive so they appear alongside your local documents when you search from the Activities menu. Similarly, photos from Facebook and Contacts from Gmail, Facebook and Twitter are automatically pulled into the GNOME Contacts app. In addition, Shell allows developers to write extensions using Javascript and CSS, which can be installed from any web browser in just one click, similar to how extensions are installed for Firefox or Chrome. No installation required!

The GNOME Classic retains the traditional desktop metaphor– sporting toolbars on the top and bottom of the screen with an application menu, a taskbar which lists all the currently open windows, and a system tray (similar to Windows XP/7/8) with icons for the clock, networking, battery, bluetooth etc. By toning down the flashy animations and graphics of its younger cousin, GNOME Classic manages to bring down its memory footprint significantly, making it ideal for power constrained computers. The radical, sweeping changes that GNOME Shell made weren't well-received with some Linux veterans, so GNOME Classic remains a vestige of what GNOME was like before Shell was introduced.

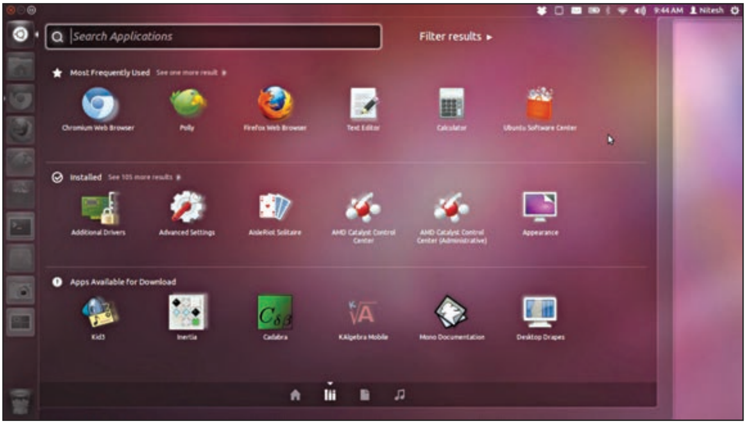


GNOME Shell's Activities gives you an overview of all open windows.

## 2. Unity

Around the same time that GNOME announced radical changes in its DE, Ubuntu's parent company, Canonical, introduced the Unity Desktop Environment. Similar to its GNOME counterpart, Unity was also developed with the intention of unifying desktop interfaces across devices – aiming at one consistent interface design across mobiles, tablets and desktops. While that dream is yet to be realized in its entirety, Unity has certainly come a long way from its clumsy beginnings three years ago. Unity uses Compiz as a Window Manager and Compositor, though a low-graphics version of Unity (called Unity 2D) uses Mutter for better performance.

Originally conceived for the Ubuntu Netbook Remix in an effort to save screen real estate on smaller screens, Unity borrows ideas from Windows as well as OS X, yet comes across as a fresh perspective on the age-old desktop shell. Along the left edge of the screen is the Unity Launcher, a dock for



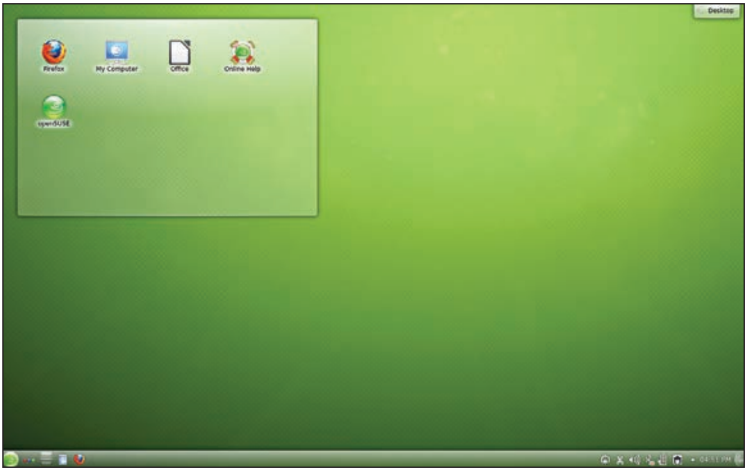
The Unity Dash serves as a centralized search for files both local and remote.

commonly used applications. The top bar is the Unity Panel. The Unity Panel has a two-fold purpose – to display the application indicators for time, battery, network status, Bluetooth, locale (along with third-party ones for displaying CPU temperature, screen brightness or the weather) and also to display the currently focused application's menu bar. The menu bar for any application window is detached from the window itself and is pinned to the top– a feature called a 'Global Menu'. The highlight of Unity, however, is hidden away. It's activated only when a user clicks on the 'Ubuntu button' (the topmost button in the launcher) or presses the Super key. A translucent window called the Unity Dash opens up, from where the user can search for both locally stored and remote information such as documents, media, applications, bookmarks etc. The addition of Unity Scopes in Ubuntu 13.04 gave the Dash some more firepower– Scopes are different categories of search results such as a YouTube scope for online videos, an Amazon Scope for products or a Soundcloud scope for online audio.

## 3. KDE

KDE is one of the oldest Desktop Environments out there, and the GNOME/KDE rivalry is rivalled only by the Emacs/Vim one. Users coming from a GNOME background will notice a stark difference in the appearance, default applications and even basic interface elements such as the desktop, widgets, file manager and the KDE Menu. Over many years, KDE has evolved to become somewhat similar to Windows in its desktop interface. Both feature glassy interface elements with blurred transparency (reminiscent of Windows' Aero theme) and a taskbar at the bottom with an application menu on the left and system tray icons on the right.

KDE has a reputation for being the most resource-intensive Desktop Environment, but not without reason. The attention to detail combined with the detailed, beautiful graphics have become a hallmark of KDE and come at a price. It uses an entirely different Window Manager called KWin, with a different graphics toolkit called Qt (as opposed to GNOME's Gtk).

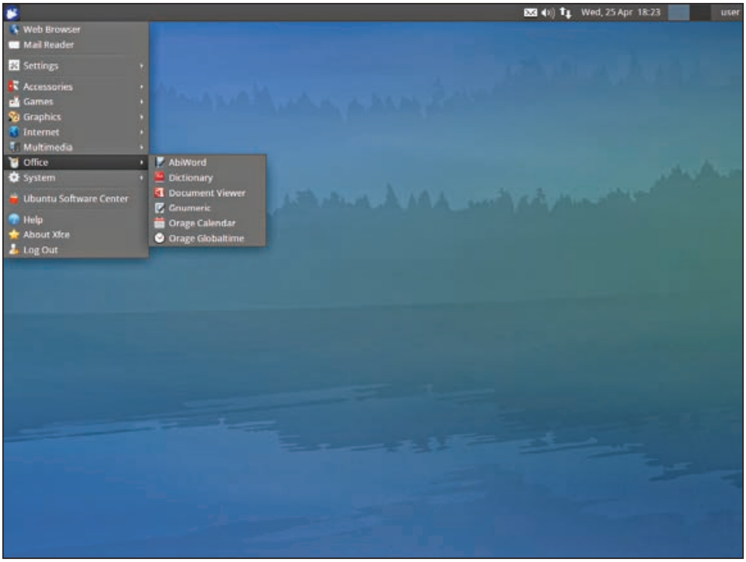


KDE's default desktop resembles Windows quite closely, with a few unique features of its own.

This results in native KDE applications looking slightly out of place in GNOME/Unity and vice-versa.

## 4. XFCE and LXDE

Both XFCE and LXDE are minimalist and lightweight alternatives to their bloated counterparts like KDE and GNOME. Both use OpenBox as the default Window Manager, which is highly configurable with an array of scripts and plugins to bend it to your will. Both stick to a fairly traditional desktop, with the usual serving of a taskbar, application / settings menu and a system tray on the right. Though, of course, you can always change it to your liking. Additionally, these DEs use the standard Gtk toolkit for creating GUI apps, which means any application written for GNOME / Unity will blend in really well with the rest of the desktop. Apart from being



XFCE may be low on flashy animations, but it makes up for it with its performance.

light on resources, LXDE also stresses on being energy-efficient, so if you need to squeeze out the last drop of battery backup from your laptop, this might be the way to go. Xubuntu and Lubuntu are two flavours of Ubuntu that ship with XFCE and LXDE as the default desktop, but they take a lot of efforts into ensuring that the result is visually appealing with a consistent desktop, icon and widget theme.

## III. The Command Line

Linux is famous for having an extremely powerful command line, for this is where the user is exposed to the complete internals of the system. It's useful to have some knowledge of the command line beyond the basics like cp, mv or ls, so here we're going to show you some useful CLI utilities to make your time at the terminal more productive. All of these programs are pre-installed on every Linux machine, so no extra installation steps will be needed.

### 1. which

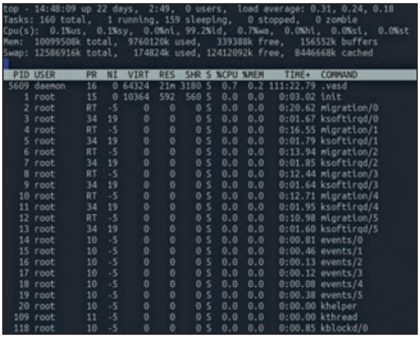
A quick way to check if a particular program is installed on your system, which gives you the path to the executable in the argument.

- `E.g. $ which cat`
- `/bin/cat`

This tells us that the ‘cat’ program is installed and is located at /bin/cat.

## 2. less

When you want to quickly view the contents of a text file, use less followed by the filename. The advantage less has over cat is that it allows you to scroll through a large document using the j/k keys. Press q to quit the preview



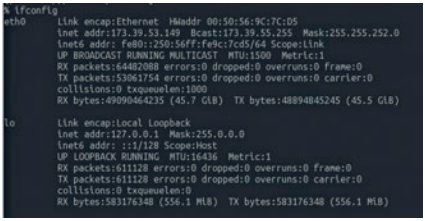
```
top - 14:48:09 up 22 days,  2:49,  0 users,  load average: 0.31, 0.24, 0.18
Tasks: 160 total,   1 running, 159 sleeping,   0 stopped,   0 zombie
Cpu(s):  0.1%us,  0.1%sy,  0.0%ni, 99.2%id,  0.7%wa,  0.0%hi,  0.0%si,  0.0%st
Mem:  10099508k total,  9760120k used,   339388k free,   156552k buffers
Swap: 12586916k total,   174824k used, 12412092k free,  8446668k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
 5609 daemon    16   0 64324  21m 3180 S  0.7  0.2 111:22.79 .vasd
    1 root      15   0 10364  592  560 S  0.0  0.0   0:03.02 init
    2 root      RT  -5     0    0    0 S  0.0  0.0   0:20.62 migration/0
    3 root      34  19     0    0    0 S  0.0  0.0   0:01.67 ksoftirqd/0
    4 root      RT  -5     0    0    0 S  0.0  0.0   0:16.55 migration/1
    5 root      34  19     0    0    0 S  0.0  0.0   0:01.79 ksoftirqd/1
    6 root      RT  -5     0    0    0 S  0.0  0.0   0:13.94 migration/2
    7 root      34  19     0    0    0 S  0.0  0.0   0:01.85 ksoftirqd/2
    8 root      RT  -5     0    0    0 S  0.0  0.0   0:12.44 migration/3
    9 root      34  19     0    0    0 S  0.0  0.0   0:01.64 ksoftirqd/3
   10 root      RT  -5     0    0    0 S  0.0  0.0   0:12.71 migration/4
   11 root      34  19     0    0    0 S  0.0  0.0   0:01.95 ksoftirqd/4
   12 root      RT  -5     0    0    0 S  0.0  0.0   0:10.98 migration/5
   13 root      34  19     0    0    0 S  0.0  0.0   0:01.60 ksoftirqd/5
   14 root      10  -5     0    0    0 S  0.0  0.0   0:00.81 events/0
   15 root      10  -5     0    0    0 S  0.0  0.0   0:00.46 events/1
   16 root      10  -5     0    0    0 S  0.0  0.0   0:00.13 events/2
   17 root      10  -5     0    0    0 S  0.0  0.0   0:00.12 events/3
   18 root      10  -5     0    0    0 S  0.0  0.0   0:00.08 events/4
   19 root      10  -5     0    0    0 S  0.0  0.0   0:00.38 events/5
   20 root      10  -5     0    0    0 S  0.0  0.0   0:00.00 khelper
  109 root      11  -5     0    0    0 S  0.0  0.0   0:00.00 kthread
  118 root      10  -5     0    0    0 S  0.0  0.0   0:00.85 kblockd/0
```

## 3. top

If you feel your computer slowing down under the weight of a lot of running programs, open up a terminal and use the top command to view a list of all running processes along with their memory and CPU usage. If you feel a process needs to be shut down (such as End Task on Windows) simply press ‘k’ followed by the process ID (PID) of the rogue process, and it will be killed by the system.

## 4. apropos

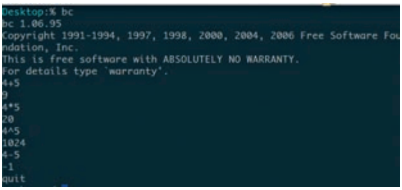
When you need to find help on the command line, this should be your first option. It’s equivalent to the -k flag on man (manual page), and it searches through all the man pages for a particular keyword supplied immediately after the command (E.g. $ apropos find)



```
% ifconfig
eth0      Link encap:Ethernet  HWaddr 00:50:56:9C:7C:D5
          inet addr:173.39.53.149  Bcast:173.39.55.255  Mask:255.255.252.0
          inet6 addr: fe80::250:56ff:fe9c:7cd5/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:64482088 errors:0 dropped:0 overruns:0 frame:0
          TX packets:53061754 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:49090464235 (45.7 GiB)  TX bytes:48894845245 (45.5 GiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:611128 errors:0 dropped:0 overruns:0 frame:0
          TX packets:611128 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:583176348 (556.1 MiB)  TX bytes:583176348 (556.1 MiB)
```

## 5. ifconfig

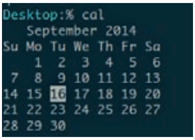
Want to know the different network interfaces (Ethernet, Wireless) on your computer with their IP and MAC addresses? ifconfig will give you a highly detailed description of the various interfaces present along with their present configuration.



```
Desktop:% bc
bc 1.06.95
Copyright 1991-1994, 1997, 1998, 2000, 2004, 2006 Free Software Fou
ndation, Inc.
This is free software with ABSOLUTELY NO WARRANTY.
For details type `warranty'.
4+5
9
4*5
20
4^5
1024
4-5
-1
quit
```

## 6. bc

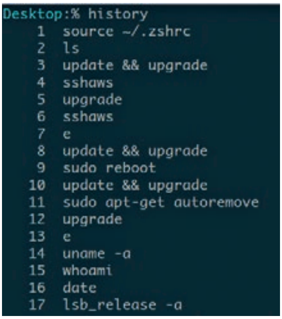
Working on the terminal and need to make a quick calculation? Use the bc command to open up a tiny calculator on the terminal that you can use for basic arithmetic operations.



```
Desktop:% cal
   September 2014
Su Mo Tu We Th Fr Sa
    1  2  3  4  5  6
 7  8  9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30
```

## 7. cal

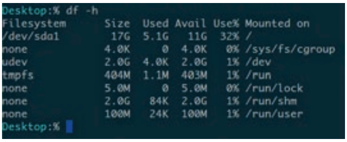
While the date command shows you the current date and time, the cal gives you a calendar for the current month in a layout similar to a physical calendar. By default it shows the current month but you can specify a different month using the -m flag (E.g. cal -m January gives you the calendar for January of the current year)



```
Desktop:% history
    1  source ~/.zshrc
    2  ls
    3  update && upgrade
    4  sshaws
    5  upgrade
    6  sshaws
    7  e
    8  update && upgrade
    9  sudo reboot
   10  update && upgrade
   11  sudo apt-get autoremove
   12  upgrade
   13  e
   14  uname -a
   15  whoami
   16  date
   17  lsb_release -a
```

## 8. history

You're aware that using the arrow keys you can cycle through your previous commands. However, this can be tedious for more than a few iterations. The history command gives you your complete history of commands entered in the current shell, along with a number next to each one. If you need to repeat one of those commands, similar enter a '!' followed by the serial number of the command in the output of the history command.



```
Desktop:% df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda1        17G  5.1G   11G  32% /
none            4.0K     0  4.0K   0% /sys/fs/cgroup
udev            2.0G  4.0K  2.0G   1% /dev
tmpfs           404M  1.1M  403M   1% /run
none            5.0M     0  5.0M   0% /run/lock
none            2.0G   84K  2.0G   1% /run/shm
none            100M   24K  100M   1% /run/user
Desktop:%
```

## 9. df

The quickest way to view the free space on all the disks connected to your computer, df (disk-free) shows you the free space in bytes. Using the -h (human-readable) turns the output into Gigabytes, giving you a better idea of size. If you don't supply any arguments, df will show you the free space on your total drive. If you give it the path to a folder (or '.' for the current folder), df will show you the free space available in that specific directory.

## 10. shutdown

As you might've guessed, this command shuts down the system, with the option to schedule a shutdown after a fixed interval of time. For e.g:

- `$ shutdown -h 21:00`

will shutdown the computer at 9pm. To shut it down right away, use

- `$ shutdown -h now`

Similarly, to reboot your machine, just use -r flag instead of -h.

- `$ shutdown -r now`

These are just a tiny fraction of the tools available at your disposal when you work on the command line. While there's no need to be able to recall every single one at the drop of a hat, it's helpful to have a general idea of the tools associated with different operations. For example vim, ctags, gcc and valgrind will come in handy if you're a programmer, ffmpeg is the swiss-army knife of working with multimedia files and mpd is a fantastic music player that runs in the background. No doubt, it's perfectly possible to use Linux without ever resorting to the Terminal, but having some fundamental knowledge can be handy for when you want to automate something or (God forbid) debug a problem in your system.

# GETTING WORK DONE WITH LINUX

Planning to make the switch to Linux, but worried about replacing your favourite applications? We give you the lowdown on some of the best Linux alternatives out there

Linux may not have a desktop market share comparable to Windows (or even OS X), but the small and dedicated community has ensured that Linux is not found lacking in applications. Comparable alternatives to popular Windows and Mac software can be easily obtained on Linux, with most applications being completely free of charge and Open Source. Moreover, Linux distributions such as Ubuntu, Fedora, Debian and OpenSUSE feature a centralised repository of software, akin to app stores, where users can search for, download and install applications, drivers, libraries etc. This greatly simplifies the app discovery process, as users need not hunt for the right program for their job. Additionally, a distribution's repository features binaries that have been tested to be compatible with the operating system, and will resolve any dependencies automatically. It also eliminates the need to compile packages from source, which can be intimidating to new users.

We've listed some Linux alternatives to commonly used Windows software, categorised by type. Unless specified otherwise, these applications can be installed from the distribution's default repository or app store, using the built-in package manager. For instance, on a Debian or Debian-based system (such as Ubuntu or Linux Mint), you can install a package using the command:

- `sudo apt-get install <package-name>`

Similarly, on a system that uses RPM-style packages, (such as RedHat, Fedora or OpenSUSE) the Yum Package Manager can be used to install a package:

- `sudo yum install <package-name>`

The sudo command ensures that the user has the required permissions to install/update software on the machine.

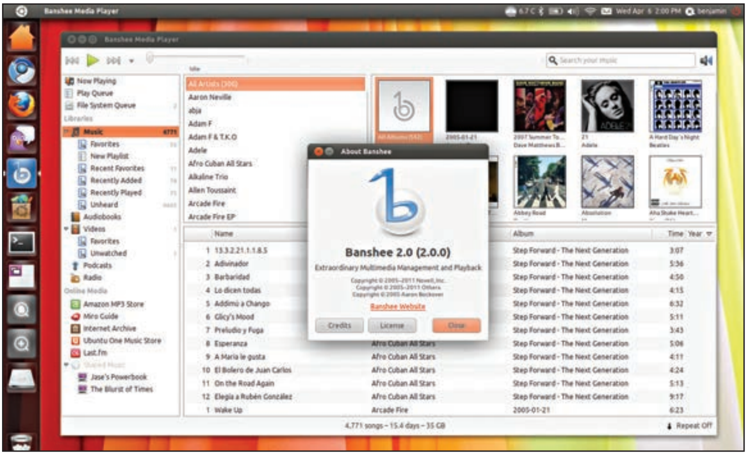
In cases where the particular application is NOT available in the distribution's repositories, we've included links to the developer's website where the application binaries are hosted.

## I. Music and Video

We all use our computers for entertainment, so a suite of applications that organise and play your music and video collection is essential. Linux boasts of a rich suite of applications for every perceivable need of yours – be it an iTunes type regular music library organiser, a lightweight music player for when you don't want to load up your entire music collection, a video player that will play any possible format you throw at it or even applications that let you edit and produce music.

### 1. Banshee/Rhythmbox

If you're facing iTunes withdrawal symptoms after switching over to Linux, both Banshee and Rhythmbox will fill that void pretty well. Most distros ship at least one of these two applications for media management, and not



Banshee is a great replacement for iTunes on Linux

without reason. Both the apps are snappy, feature-rich and can play a variety of formats for music, videos, audiobooks and podcasts. Both are nearly iTunes feature complete, and will even sync your iPod with your music collection (excluding iPod Touch). You can choose between different layouts using filters such as Genre, Artist and Album, automatically fetch album art, scrobble your music to Last.fm, and even play internet radio streams using Jamendo. Additionally, the Miro podcast directory is integrated into Banshee, allowing you to discover and subscribe to podcasts from within the program itself. A handy context pane shows you metadata such as lyrics, artist information, similar artists and popular videos on YouTube.

## 2. Clementine

Originally introduced as a rewrite of the popular KDE application Amarok, Clementine has been gaining popularity thanks to its rock solid stability and ability to handle large music libraries without slowing down. Clementine is a Linux analogue to Windows' popular Winamp program – in that, it's lightweight, quick and not very nice to look at. Thanks to its Qt-based interface, Clementine sticks out like a sore thumb on GNOME-based distros such as Ubuntu or Linux Mint. However, it does a great job with media playback, Last.fm scrobbling, lyrics and metadata lookup, media transcoding and library management.

### 3. VLC Media Player

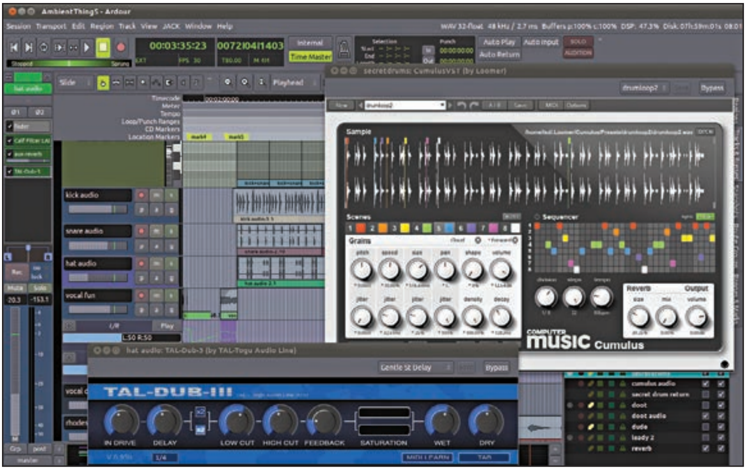
The venerable ‘plays anything you throw at it’ VLC is just as good on Linux as on Mac or Windows, and should be your go-to player for all kinds of video. It has the exact same features as its Windows/Mac siblings, so there’s nothing new to report here.

### 4. Audacity

The common man’s audio workstation, Audacity is a cross-platform application for editing audio streams. You can add various effects such as reverb, delay, phaser or wah to audio, crop, copy or repeat sections from a track, and mix sounds by adjusting the levels on different tracks. Audacity also allows you to record audio from a microphone, line input or USB audio interface with support for multiple tracks. If you’re a beginner looking to get your feet wet in the world of recording and producing, Audacity should do the job fine.

### 5. Ardour

For recording artists who need a full-fledged digital audio workstation (DAW) with support for VST plug-ins, advanced equalisers, working with MIDI tracks and much more, Ardour is the DAW of choice. Fully open source, Ardour rivals its Windows counterparts such as ProTools and

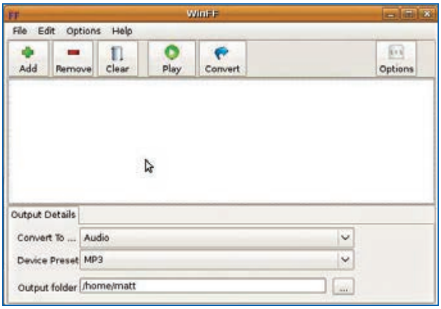


Ardour is a sophisticated and fully featured digital audio workstation for Linux and Mac systems

Cubase, with sophisticated tools for all stages of music production – be it recording, editing or mixing. It supports a variety of input and output interfaces and complex signal flow paths, along with an array of FX plug-ins and software instruments to achieve that perfect sound.

## 6. WinFF/Sound Converter

Converting media files between different formats is an inescapable task, whether you're trying to compress media to save space or convert media to, say, an iPod-compatible format. FFmpeg is a feature-packed library that supports converting between nearly every known media format along with a tonne of configuration options. However, it's a command line interface (CLI) tool, and typing out the various parameters can be daunting and prone to errors. WinFF is a graphical front-end to FFmpeg that eliminates the complexity and has presets for converting videos into different formats. This is especially handy if your target device is a portable media player. Just select your device from the drop-down list and WinFF will automatically decide the optimal parameters for conversion. Sound Converter is a similar tool for converting between different audio formats.



Convert To ... Audio
Device Preset MP3
Output folder /home/matt

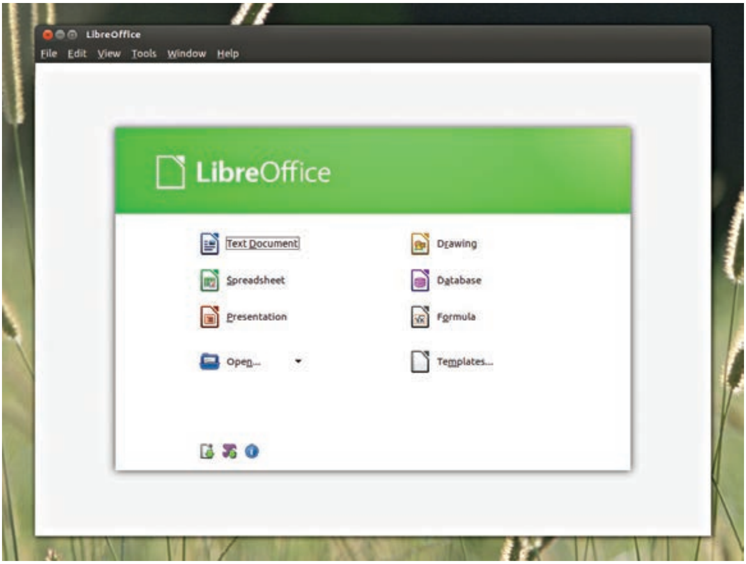
Use WinFF to convert your videos to an iPod-friendly format

## II. Productivity

Any operating system needs a rich set of productivity tools if it's to be taken seriously, and Linux is no different. While the best productivity apps on Linux don't hold a candle to Microsoft Office, they're still pretty good for the casual user. Most of us use not more than 20 percent of the feature set of Microsoft Word or Excel, so programs such as LibreOffice and GNU Calc should have you covered. On the off chance that you do need that added functionality, you can run Microsoft Office under WINE (short for "Wine Is Not an Emulator") – a program that lets you install and run Windows programs under Linux.

## 1. LibreOffice/OpenOffice

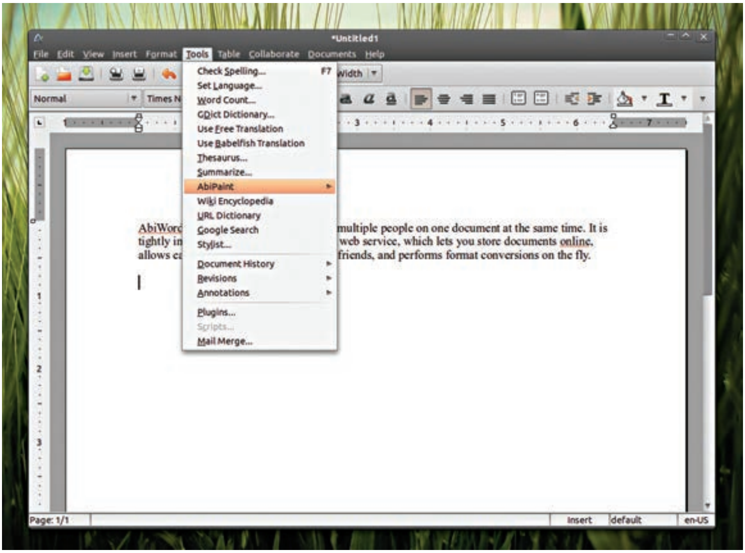
OpenOffice was one of the earliest all-in-one office suites to rival Microsoft Office, but its changing ownership over the years caused it to be forked into LibreOffice – a more actively developed branch of OpenOffice. Both suites have in common software that's equivalent to Word, Excel, PowerPoint, Access and even Paint. Formatting and formulas are compatible with Microsoft's offerings, so a document created with Calc or Writer is editable even in the latest version of Microsoft Office. These free offerings save your documents in an Open Document Format (ODF) with Apache by default, though you can manually specify .docx or .xlsx formats as well. The LibreOffice Math program allows for the creation of mathematical equations and formulas that can then be reused in other LibreOffice applications.



The LibreOffice suite is a complete replacement for Microsoft Office

## 2. Abiword/GNUmeric

Most of us don't need the bloat and extraneous features that come with an all-in-one office suite, and would rather use standalone programs that can get the job done with minimal fuss. Abiword is such a word processor with a fairly lean feature set. You can create documents such as scientific



AbiWord multiple people on one document at the same time. It is
tightly in web service, which lets you store documents online,
allows e friends, and performs format conversions on the fly.

Abiword is a free, standalone word processor for Linux, Windows and Mac systems

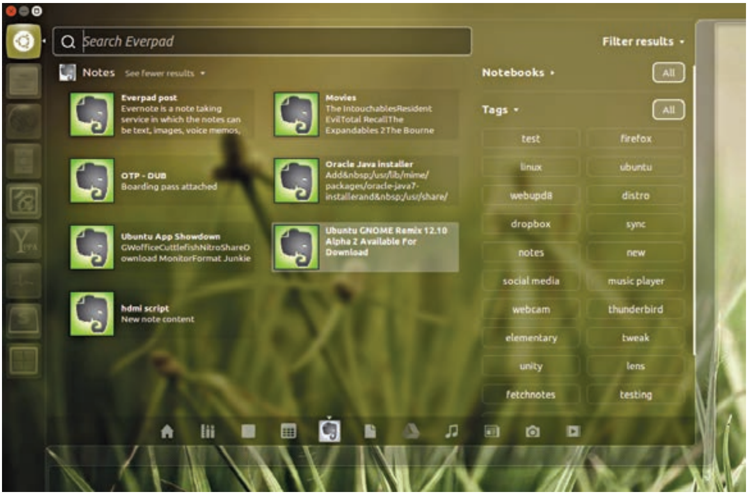
papers, reports and letters using the layout editing options, and polish it up with standard formatting and grammar/spelling features. GNUmeric, a spreadsheet program by the GNOME Project, is another worthy mention. You should know though that it lacks advanced features such as pivot tables and macros found in Microsoft Excel, and doesn't support the newer .xlsx format for spreadsheets.

## 3. GNU Octave/MATLAB

MATLAB is a popular tool for mathematical and statistical analysis, plotting curves and simulation of real-world systems. It's widely used in academia in fields as diverse as Mathematics, Fluid Mechanics, Digital Audio Processing and Aerodynamics. While an official Linux port of MATLAB exists, its performance leaves a lot to be desired. Additionally, MATLAB is proprietary software and requires an expensive license to use it. A free, open source alternative is GNU Octave, a command line tool that includes some of the same methods and functions for performing mathematical analysis and simulations. As of version 3.8 of Octave (released earlier in 2014), a graphical front-end has been added, bringing it closer in appearance to MATLAB.

### 4. Nixnote/Everpad

While Evernote hasn't shown any interest in bringing its massively popular note-taking platform to Linux, several third-party applications exist to fill that void. Chief among these alternatives are Everpad and NixNote. Everpad is a native application – meaning, it used GTK+ (previously called GIMP Toolkit) bindings, giving it a native look and feel – with excellent integration with Ubuntu's Unity environment. It sports an application indicator, notification bubbles for new items and the ability to search for notes from within the Ubuntu Dash. If your Evernote account has many notebooks or thousands of notes, Everpad may occasionally feel sluggish. NixNote (formerly called NeveNote) is a Java-based program that's available on all desktop platforms. It's relatively fast, but due to it being a Java-based app the interface sticks out like a sore thumb in a Linux environment. If you're more of a command line type of person, Evernote has a third-party CLI tool called Geeknote (*http://www.geeknote.me/).*


Search Everpad
Filter results
Notes
See fewer results
Notebooks
All
Tags
All
Everpad post
Evernote is a note taking service in which the notes can be text, images, voice memos,
Movies
The IntouchablesResident EvilTotal RecallThe Expandables 2The Bourne
OTP - DUB
Boarding pass attached
Oracle Java installer
Add /usr/lib/mime/packages/oracle-java7-installer /usr/share/
Ubuntu App Showdown
GWofficeCuttlefishNitroShareD ownload MonitorFormat Junkie
Ubuntu GNOME Remix 12.10 Alpha 2 Available For Download
hdmi script
New note content
test
firefox
linux
ubuntu
webupd8
distro
dropbox
sync
notes
new
social media
music player
webcam
thunderbird
elementary
tweak
unity
lens
fetchnotes
testing

Everpad lets you search your Evernote notes right from within Ubuntu's Dash

## III. Web

This is one category of applications for which Linux has received much attention, particularly from the major players. Web browsers for Linux such as Google Chrome, Chromium, Mozilla Firefox and Opera enjoy the same level of sophistication as their Windows counterparts and even follow the same release cycle. Notable exceptions are Microsoft's Internet Explorer and Apple's Safari. There do exist a few Linux-only browsers such as GNOME's Empathy and Midori from the Elementary Project, but neither is nearly as advanced as Firefox and Chrome.

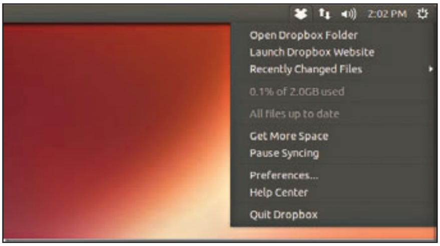
Similarly, voice over IP service Skype is available as a native, standalone app, not requiring any special workarounds. Vuze and Transmission are popular BitTorrent clients on Linux.

## IV. Utilities

Utility software are those programs that don't fall under a specific segment, but are integral to the health and upkeep of your machine. Since each operating system is different, it's not possible to find exact alternatives to Windows software. The problems encountered and maintenance required on a Linux system are very different from those on Windows. E.g. Windows users are familiar with the Defragmenting tool, used to make sure that the used data blocks in a hard drive are properly aligned with each other for optimal retrieval. Linux filesystems such as ext3/ext4 don't need this feature since they aren't prone to fragmentation. Similarly, Linux has very few viruses in the wild, and due to the nature of this OS, it's very difficult for a non-root process to go rogue and cause permanent damage. Hence, anti-viruses and anti-malware applications for Linux aren't very common, though a few certainly exist.

### 1. Dropbox/Insync

Everyone's favourite cloud syncing tool, Dropbox (downloadable at *www.dropbox.com),* has a wonderful program for Linux users. It works the same way as its Windows/OS X counterpart – by monitoring a folder on your machine and uploading any files from that folder to the cloud. You can instantly share any file with a web link using the right-click menu, provided you have the Nautilus File Manager extension installed.`

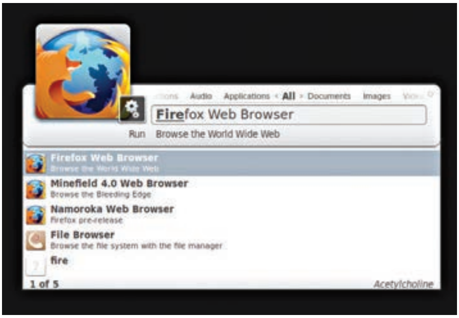


Dropbox fully supports Linux with a handy indicator applet for Ubuntu

While Google Drive doesn't have an official client for Linux, Insync (downloadable at *https://www.insynchq.com/),* a third-party tool wholeheartedly supports Linux. It even adds some extra features, such as support for multiple accounts, auto-conversion of Google Docs into Microsoft Office compatible formats and notifications for changed files/documents. Insync isn't free though, and comes with a one-time fee of $15. If you'd rather go the free way, a utility called 'google-drive-ocamlfuse' can be used to mount your Google Drive as a regular disk volume under Linux. You can then interact with your files just as you would with any locally stored ones, and google-drive-ocamlfuse will upload/download the changes.

## 2. Synapse

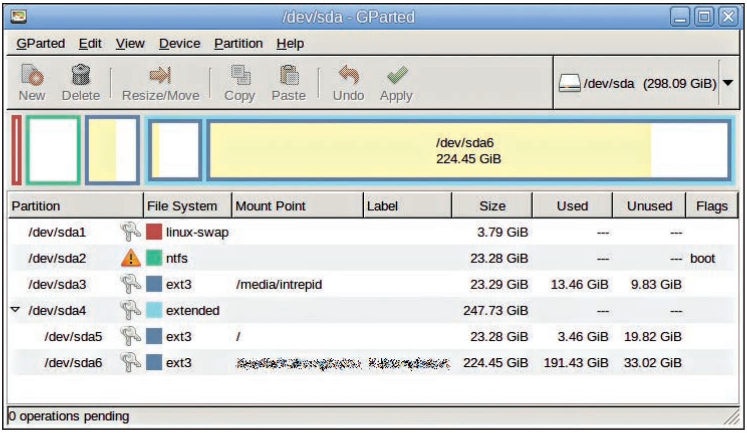
Synapse is one of those nifty little apps that you don't know you need until you've used it. It's essentially a desktop launcher – a search box that you can bring up anywhere in your system with a keyboard shortcut, and then proceed to search for almost any kind of data. Synapse automatically indexes and searches all the files on your hard drive, so that specific documents or media files are found at lightning speed. Since it also recognizes all of the apps installed on your system, it's also the quickest way to launch an app. Simply start typing the name of the app and Synapse will automatically suggest the most likely one. It comes with several plug-ins that can, among other things, perform quick calculations or look up words in the dictionary. If Synapse can't find what you're looking for, it will automatically launch your default web browser and perform a Google search for you.



Synapse is often the quickest way to open apps and files, look up words or perform calculations

## 3. Crashplan Backup

Every computer needs a backup plan, and Linux systems are no different. The myriad of command line tools available means that the user has plenty of flexibility and control when it comes to formulating a backup plan. These choices, however, may be overwhelming to the new user. Crashplan is a cross-platform, Java-based program that provides a comprehensive, automated backup plan. Available on Windows, Mac, Linux, iOS and Android, Crashplan can back up files to a local folder or networked drive and even offers unlimited cloud backups for its Pro customers. All backups are encrypted with a passphrase of the users' choosing. What's more, backups are continuous, meaning files are constantly monitored for changes and only the changed portions of files are uploaded – making it space efficient.



| Partition | File System | Mount Point | Label | Size | Used | Unused | Flags |
|---|---|---|---|---|---|---|---|
| /dev/sda1 | linux-swap | | | 3.79 GiB | --- | --- | |
| /dev/sda2 | ntfs | | | 23.28 GiB | --- | --- | boot |
| /dev/sda3 | ext3 | /media/intrepid | | 23.29 GiB | 13.46 GiB | 9.83 GiB | |
| /dev/sda4 | extended | | | 247.73 GiB | --- | --- | |
| /dev/sda5 | ext3 | / | | 23.28 GiB | 3.46 GiB | 19.82 GiB | |
| /dev/sda6 | ext3 | [redacted] | [redacted] | 224.45 GiB | 191.43 GiB | 33.02 GiB | |

GParted lets you create, edit and manage all the partitions on your hard drive

## 4. GParted

If you're working with Linux, odds are you're going to have to create or modify the partitions on your computer's hard drive. While the process of creating and deleting partitions is fairly easy, it must be performed with utmost care, for there's always the risk of losing data permanently. To that end, GParted is a graphical utility that can create, delete, resize and format hard drive partitions across a variety of filesystems such as ext3/4, btrfs, zfs, Linux SWAP, NTFS, FAT32 etc. You can visualise your current partition table in a linear format, giving you a good idea of how much space to allocate for various types of partitions. Considering how handy this tool is, you'll find it included on most Linux live CDs.

## 5. Zeitgeist and GNOME Activity Journal

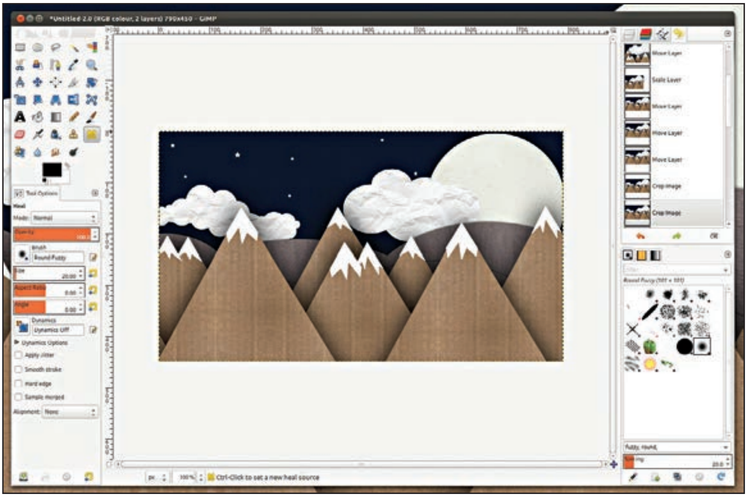
A handy bit of machine learning can be found in modern Linux distros in the form of the Zeitgeist daemon. (A daemon is any process that automatically starts at boot and silently runs in the background.) Zeitgeist collects data about the files opened, email conversations, instant messaging and websites, and makes these logs readily available to any application that requests it via an API. Apps can use this data to provide suggestions based on a user's past behaviour. The Activity Journal lets you view your usage in the form of a timeline. Synapse, the launcher, uses information from Zeitgeist to accurately determine the files to show when a user starts typing.

## V. Multimedia

We're not going to lie – Linux doesn't have the same selection of applications for multimedia tasks as Windows or OS X, thanks chiefly to the absence of the Adobe Creative Suite on Linux. Seasoned media professionals will probably scoff at the alternatives, but for most casual editing, photo correction or video production, these tools will do just fine.

### 1. GIMP

The popular open source alternative to Adobe Photoshop has only gotten better with age. GIMP is suitable for retouching, editing, creating and combining raster graphics (i.e. the non-scalable kind). It's a fairly stable and mature piece of software, with support for a wide range of hardware include tablets and styluses. While it is not a complete replacement for Photoshop, it is cost effective (it's free!) and will perform nearly any photo-editing task you throw at it with ease.



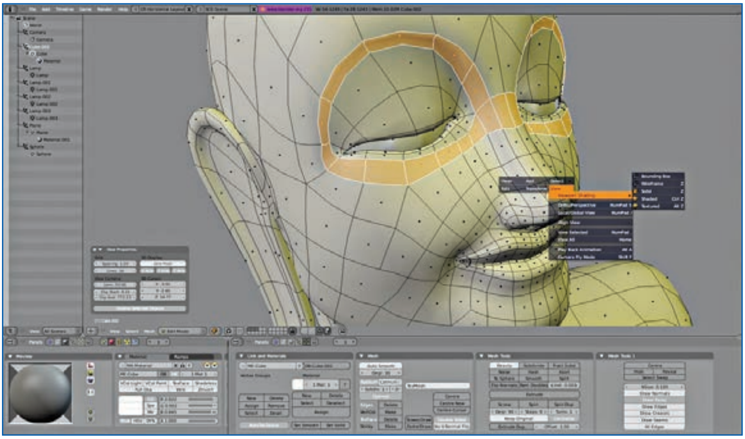
GIMP is the go-to tool for image editing on Linux

## 2. Inkscape

Inkscape is a vector graphics editing tool (think: Adobe Illustrator). While GIMP works mainly with raster graphics, Inkscape is made for working with vectors or scalable graphics – particularly for the web. It sports an object creation tool, an object manipulation tool, text support and compatibility across formats including SVG (Scalable Vector Graphics) and AI (Adobe Illustrator).

## 3. Blender

A 3D modelling software similar to Autodesk Maya, Blender is a fully featured tool for creating rich, detailed 3D models. It's built to take advantage of both, CPU and GPU-based rendering, and supports HDR lighting, animation, sculpting and various perspectives to get the look you need. Blender comes with an in-built compositor, so you don't need a third-party tool. The game creation engine allows you to create rich gaming workflows, while the video editor can edit movies and video clips with audio mixing, syncing and live preview support. It comes with a Python-based scripting interface for automating workflows and creating your own plug-ins.



Blender lets you create hyper-realistic looking 3D models and animations

## VI. Command Line Tools

Any discussion on Linux programs would be incomplete without mentioning a few command line tools. The terminal is where the power of

Linux really comes alive, so we've included a few of our favourite CLI tools for your use.

## 1. Youtube-dl

We've all downloaded YouTube videos at some point in time, but the process is fraught with complications. You usually enter the video URL into a website, which then asks you to download a Java plug-in (which has been shown to pose a security risk). A workaround to bypass this tedious process is the 'youtube-dl' command line tool, which downloads YouTube videos. You can specify the format (.flv, .mp4, .avi or .webm) and even the resolution of the video being downloaded. Though the name has 'YouTube' in it, you can use it to download files from a variety of services, including Vimeo, 8tracks and Dropbox (For a full list, visit *http://dgit.in/YTsites).* If you want to download a bunch of videos without having to re-enter the URL every time, simply enter all the links into a text file and pass the location of the file as an argument.

Tips for usage:

- To download a video in its default (.flv) format, use:

```
$ youtube-dl “<enter youtube URL here>”
```

- To view the different formats/resolutions available for download, use the following command:

```
$ youtube-dl –all-formats “<enter YouTube URL here>”
```

Find the documentation for the youtube-dl command line tool at *http://dgit.in/YTDocumentation*

## 2. Wget

Wget is a command that lets you download files from across a network using *HTTP/S* or *FTP,* and optimises the download for slow or unreliable networks. If your download is interrupted due to intermittent network connectivity, Wget will automatically resume downloading from where it left off. Wget is typically found pre-installed on all Linux systems, being a part of the core utils package.

Tips for usage:

In its basic form, Wget takes one argument, i.e. the URL of the file.

```
$ wget <URL of the file>
```

- To download a list of files, put them in a text file and point Wget to this file:

```
$ wget -i /path/to/list _ of _ files.txt
```

- To enable Wget to resume a download if it gets interrupted, use:

```
$ wget -c <URL of the file>
```

## 3. Rsync

An extremely handy tool for synchronising two or more directories, Rsync is typically used for backing up extremely large datasets due to its ability to perform incremental file transfers. Using a de-duplication algorithm, Rsync only copies over parts of a file that have changed, thus lowering transfer times and bandwidth requirements – making it an ideal choice for synchronising directories over a network. Rsync is usually installed by default on most systems, and hence a part of the default repositories of all major Linux distributions.

Tips for usage:

```
$ rsync -avzhP <source directory> <destination directory>
```

Both, the source and the destination can be either local folders or remote locations (using the 'username@hostname:/path/to/' folder format).

Here's a brief description of the flags used in the above command:

**-a:** Archive mode, which copies recursively and preserves symbolic links, hard links, permissions and modification times.

**-v:** Verbose mode, where all logs are printed to the user's terminal window.

**-z:** Enables compression of files, which is especially valuable when copying files over a network.

**-h:** Prints all data sizes in a human readable format (e.g. KB or MB instead of bytes).

**-P:** The purpose of this flag is two-fold – to give you a progress bar that helps visualise your transfers and to resume the transfers if any network connectivity issues are experienced.

## 4. MD5Sum

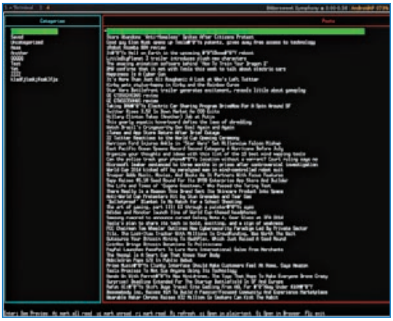
A checksum is a unique alpha-numeric value computed by running an algorithm over a set of data. Checksums are repeatable, meaning the same data will always generate the same checksum value. The MD5sum is a 128-

bit checksum that's commonly used to verify the authenticity of a file (or set of files). Running the 'md5sum' command with a file (or set of files) will generate a 32-character value. This can be compared with the originally provided value to verify if a downloaded file is genuine and free of corruptions. MD5Sum usually comes bundled with all Linux systems.

Tips for usage:

- `$ md5sum </path/to/file>`

## 5. Feednix



Feednix is a nifty CLI-based Feedly reader for Linux systems

Pander to your inner geek by using a command line RSS feed reader! While Newsbeuter is a popular CLI-based feed reader, Feednix is another alternative that offers the added advantage of Feedly integration. With the demise of Google Reader, most of us have migrated our RSS feeds to Feedly, so having a CLI tool that plugs directly into the service and pulls all your unread articles into a text-only format is a great boon! The downside is that Feednix is not readily packaged in a binary format for easy installation and requires installation from source. (Feednix is also available in the Arch User Repository). For download links and installation instructions, visit the Github page at *http://dgit.in/GitHubFeednix.* **d**

## CHAPTER #07

# LINUX: TIPS, TRICKS AND TROUBLESHOOTING

Now that you have seen the power of Linux, take a look at some common issues you might face with a Linux installation and how to troubleshoot them. Also, learn some neat tips and tricks to make you a Linux pro.

## Troubleshooting

### Logical troubleshooting

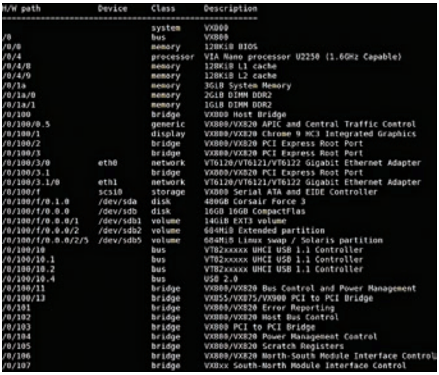
All issues in a system are resolvable through scientific reasoning, all it takes is a little patience and information. You may find a lot of troubleshooting guides out there but you won't find one for each and every problem that you encounter. However, once you are adept at logically approaching the problem, you will start finding the solutions yourself or at least find out what exactly to look for online to resolve the issue. Plus, it saves time and money, and you won't have to depend on anyone in an emergency. However, you do need to understand computers a little bit in order to arrive at a conclusion regarding the issue.

## Basics

You need to have a good understanding of what your computer is made up of, the hardware and the software. By this we do not mean in-depth knowledge of how it all works together but, the ability to identify parts, their functions and which part of the operating system controls those parts.

***Tools tip:** You can use the 'lshw' command is used to show all the hardware information of the system.*

In the Linux OS, you should be familiar with the terminal functions and the directory structure and its functioning. Most important of all, you should be familiar with configuration and log files, as a lot of issues could be resolved through configuration and the log files help you trace the source of the issue.



```
H/W path              Device      Class       Description
==========================================================
                                  system      VX800
/0                                bus         VX800
/0/0                              memory      128KiB BIOS
/0/4                              processor   VIA Nano processor U2250 (1.6GHz Capable)
/0/4/8                            memory      128KiB L1 cache
/0/4/9                            memory      128KiB L2 cache
/0/1a                             memory      3GiB System Memory
/0/1a/0                           memory      2GiB DIMM DDR2
/0/1a/1                           memory      1GiB DIMM DDR2
/0/100                            bridge      VX800 Host Bridge
/0/100/0.5                        generic     VX800/VX820 APIC and Central Traffic Control
/0/100/1                          display     VX800/VX820 Chrome 9 HC3 Integrated Graphics
/0/100/2                          bridge      VX800/VX820 PCI Express Root Port
/0/100/3                          bridge      VX800/VX820 PCI Express Root Port
/0/100/3/0            eth0        network     VT6120/VT6121/VT6122 Gigabit Ethernet Adapter
/0/100/3.1                        bridge      VX800/VX820 PCI Express Root Port
/0/100/3.1/0          eth1        network     VT6120/VT6121/VT6122 Gigabit Ethernet Adapter
/0/100/f              scsi0       storage     VX800 Serial ATA and EIDE Controller
/0/100/f/0.1.0        /dev/sda    disk        480GB Corsair Force 3
/0/100/f/0.0.0        /dev/sdb    disk        16GB 16GB CompactFlas
/0/100/f/0.0.0/1      /dev/sdb1   volume      14GiB EXT3 volume
/0/100/f/0.0.0/2      /dev/sdb2   volume      684MiB Extended partition
/0/100/f/0.0.0/2/5    /dev/sdb5   volume      684MiB Linux swap / Solaris partition
/0/100/10                         bus         VT82xxxxx UHCI USB 1.1 Controller
/0/100/10.1                       bus         VT82xxxxx UHCI USB 1.1 Controller
/0/100/10.2                       bus         VT82xxxxx UHCI USB 1.1 Controller
/0/100/10.4                       bus         USB 2.0
/0/100/11                         bridge      VX800/VX820 Bus Control and Power Management
/0/100/13                         bridge      VX855/VX875/VX900 PCI to PCI Bridge
/0/101                            bridge      VX800/VX820 Error Reporting
/0/102                            bridge      VX800/VX820 Host Bus Control
/0/103                            bridge      VX800 PCI to PCI Bridge
/0/104                            bridge      VX800/VX820 Power Management Control
/0/105                            bridge      VX800/VX820 Scratch Registers
/0/106                            bridge      VX800/VX820 North-South Module Interface Contro
/0/107                            bridge      VX8xx South-North Module Interface Control
```

The 'lshw' command lists the hardware information

## Into the unknown

This is where most of us step back, new territory. Remember, there will always be something new to learn everyday and unless you start to experiment with new knowledge, you will not learn anything new. Besides, if you ignore the problem, it won't go away but it'll become even worse. So it is better that you tackle it head-on and learn something new in the process which will go a long way in making you one of the pros. Do not forget, all the Linux pros out there were someday as clueless as a newbie, they learnt everything they know through experimentation.

All that you have to be careful with is logging everything that you do. This is just to ensure that in case if there are any unwanted results by your experimenting, you can always retrace your steps and revert the changes. By the end of your exploration or experimentation, call it what you want, you will have gained a lot more knowledge and confidence with operating the system.

## Understanding the core of the issue

A lot of times, the problem is not what it seems on the face. What might look like a speaker system gone bad might actually be a corrupt or missing driver. The point here is to draw out all possible reasons through logical observation and exploration rather than taking a guess.

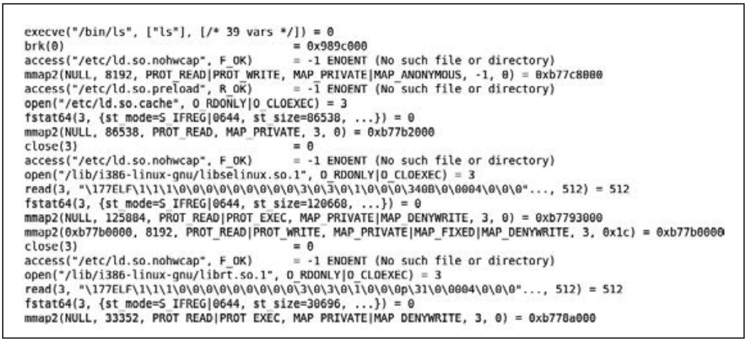
Understand the core issue is a simple task of following the effects caused by it. These will be your main pointers towards the solution.

Resolving an issue is like detective work, you look at the problem and ask yourself a few questions.

### What is the exact nature of the problem?

It may not seem much to think of but if this step is not approached properly then further investigation could be misleading. Although it is good to take into account error messages, they do not really describe the problem the way we would like to understand them. So it is better to go after the exact nature of the problem yourself.

You should take into account all the variables surrounding the problem like the problem itself, the result it produces and what happens when you perform a task in a certain environment. Taking all this into account helps you get a concrete understanding of the issue and shortlist the probable causes. And if you take help from someone online, like in forums, and tell them these conclusions, they might be able to provide you with an accurate solution. However, if the issue is not critical or that you are not short on time, it is recommended that you try to resolve the issue yourself to further your own knowledge.



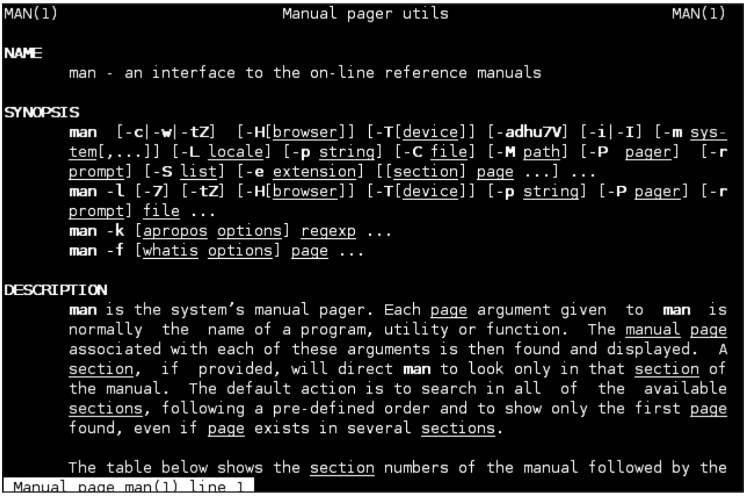
```
execve("/bin/ls", ["ls"], [/* 39 vars */]) = 0
brk(0)                                  = 0x989c000
access("/etc/ld.so.nohwcap", F_OK)      = -1 ENOENT (No such file or directory)
mmap2(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0xb77c8000
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
open("/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat64(3, {st_mode=S_IFREG|0644, st_size=86538, ...}) = 0
mmap2(NULL, 86538, PROT_READ, MAP_PRIVATE, 3, 0) = 0xb77b2000
close(3)                                = 0
access("/etc/ld.so.nohwcap", F_OK)      = -1 ENOENT (No such file or directory)
open("/lib/i386-linux-gnu/libselinux.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\1\1\1\0\0\0\0\0\0\0\0\0\3\0\3\0\1\0\0\0\340B\0\0004\0\0\0"..., 512) = 512
fstat64(3, {st_mode=S_IFREG|0644, st_size=120668, ...}) = 0
mmap2(NULL, 125884, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0xb7793000
mmap2(0xb77b0000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1c) = 0xb77b0000
close(3)                                = 0
access("/etc/ld.so.nohwcap", F_OK)      = -1 ENOENT (No such file or directory)
open("/lib/i386-linux-gnu/librt.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\1\1\1\0\0\0\0\0\0\0\0\0\3\0\3\0\1\0\0\0p\31\0\0004\0\0\0"..., 512) = 512
fstat64(3, {st_mode=S_IFREG|0644, st_size=30696, ...}) = 0
mmap2(NULL, 33352, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0xb778a000
```

Output of ‘strace’ command run on ‘ls’

***Tools tip:** You can use the ‘strace’ command in Linux to generate logs which you can use for your investigation or for taking professional help. The command tracks a program and all its activities.*

### Were there any changes made in the system between the time from when it was fine to now, when it has a problem?

This is very important as more often than not, issues are caused by changes made in the system, whether in the software or the hardware. Hence, taking this into consideration should be an important part of your investigation. It is a good idea to take a look at system logs for this as they can point out the changes made to a system.



```
MAN(1)                        Manual pager utils                        MAN(1)

NAME
       man - an interface to the on-line reference manuals

SYNOPSIS
       man  [-c|-w|-tZ]  [-H[browser]] [-T[device]] [-adhu7V] [-i|-I] [-m sys-
       tem[,...]] [-L locale] [-p string] [-C file] [-M path] [-P  pager]  [-r
       prompt] [-S list] [-e extension] [[section] page ...] ...
       man -l [-7] [-tZ] [-H[browser]] [-T[device]] [-p string] [-P pager] [-r
       prompt] file ...
       man -k [apropos options] regexp ...
       man -f [whatis options] page ...

DESCRIPTION
       man is the system’s manual pager. Each page argument given  to  man  is
       normally  the  name of a program, utility or function.  The manual page
       associated with each of these arguments is then found and displayed.  A
       section,  if  provided, will direct man to look only in that section of
       the manual.  The default action is to search in all  of  the  available
       sections, following a pre-defined order and to show only the first page
       found, even if page exists in several sections.

       The table below shows the section numbers of the manual followed by the
 Manual page man(1) line 1
```

The ‘man’ command displays documentation for Linux components

### What are the effects of the problem?

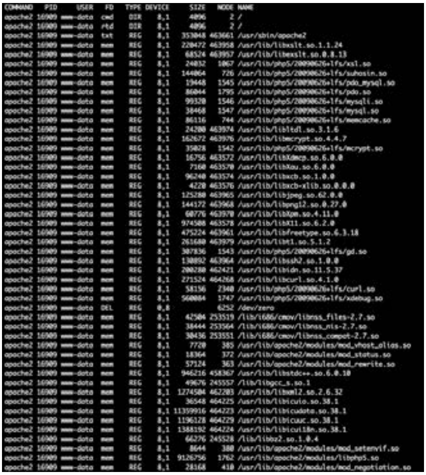
Next, you must investigate all the effects being caused by the problem. Do the effects point to any specific hardware or software? How is the problem manifesting? Through visual, sound, etc. effects? If you have a basic understanding of the hardware and software of your system, you will be able to narrow down the possible causes.

***Tool tip:** The ‘man’ command is very useful as it displays the documentation for a Linux component whether it is a program, utility or function. When you go* *through log files and traces, you may come across references to such components that you do not know about. This is where the 'man' command can come in handy to demystify the component's purpose.*

If you have investigated with clarity and logic then your deduction as to the cause of the problem will be accurate. Your deduction should be clear and should be supportable with evidence.

## Getting your hands dirty

Now that you have deduced the cause of the problem, it's time to resolve it. There may be many ways to resolve an issue so the ideal approach to resolving it is to test different solutions one by one with different parameters until it is resolved. You need to chalk out a proper methodology to resolve this issue.



Sample output of 'lsof' command

Always start with the simplest and least risky solution, moving up from here on. The results might sometimes surprise you even though they may not resolve the issue, because they could very well change your deduction about the cause. You should take these results into consideration and revise your deductions accordingly.

A very important thing to do is to keep track of the changes that you make with each attempt and keep a copy of the previous settings. Changes to configuration files should be recorded with accuracy. Always make a copy of a file before replacing it. All this will help you revert to a previous stage in case the current repair attempt causes further issues.

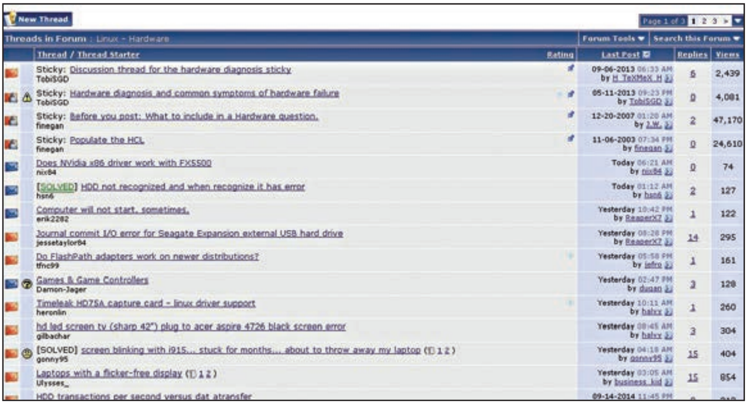
***Tools tip:** There is another command called 'logsave' which captures the output of a program to a log file. This can be useful for keeping records of your repair attempts. Tools tip: The 'lsof' command displays all the files currently opened by the system.*

*It can also be useful in finding out all the files that a process uses or that which process uses which files.*

### Seeking professional help?

After you have exhausted all the repair strategies to the issue and still not arrived at a solution, it is time to seek professional help as the issue might be more technical than you have knowledge of.

However, all your efforts are not wasted as the solution will arrive quickly because of your exhaustive test results, which is exactly what the professionals look for.  And when the professionals give their solution, it won't take you much time to understand their repair attempt as you were already half way there. You end up being closer to a pro Linux user.



| Thread / Thread Starter | Rating | Last Post | Replies | Views |
|---|---|---|---|---|
| Sticky: Discussion thread for the hardware diagnosis sticky<br>TobiSGD | | 09-06-2013 06:33 AM<br>by H_TeXMeX_H | 6 | 2,439 |
| Sticky: Hardware diagnosis and common symptoms of hardware failure<br>TobiSGD | | 05-11-2013 09:23 PM<br>by TobiSGD | 0 | 4,081 |
| Sticky: Before you post: What to include in a Hardware question.<br>finegan | | 12-20-2007 01:20 AM<br>by J.W. | 2 | 47,170 |
| Sticky: Populate the HCL<br>finegan | | 11-06-2003 07:34 PM<br>by finegan | 0 | 24,610 |
| Does NVidia x86 driver work with FX5500<br>nix84 | | Today 06:21 AM<br>by nix84 | 0 | 74 |
| [SOLVED] HDD not recognized and when recognize it has error<br>hsn6 | | Today 01:12 AM<br>by hsn6 | 2 | 127 |
| Computer will not start, sometimes.<br>erik2282 | | Yesterday 10:42 PM<br>by ReaperX7 | 1 | 122 |
| Journal commit I/O error for Seagate Expansion external USB hard drive<br>jessetaylor84 | | Yesterday 08:28 PM<br>by ReaperX7 | 14 | 295 |
| Do FlashPath adapters work on newer distributions?<br>tfnc99 | | Yesterday 05:58 PM<br>by jefro | 1 | 161 |
| Games & Game Controllers<br>Damon-Jager | | Yesterday 02:47 PM<br>by dugan | 3 | 128 |
| Timeleak HD75A capture card - linux driver support<br>heronlin | | Yesterday 10:11 AM<br>by halxy | 1 | 260 |
| hd led screen tv (sharp 42") plug to acer aspire 4726 black screen error<br>gilbachar | | Yesterday 08:45 AM<br>by halxy | 3 | 304 |
| [SOLVED] screen blinking with i915... stuck for months... about to throw away my laptop ( 1 2 )<br>gonny95 | | Yesterday 04:18 AM<br>by gonny95 | 15 | 404 |
| Laptops with a flicker-free display ( 1 2 )<br>Ulysses_ | | Yesterday 03:05 AM<br>by business_kid | 15 | 854 |
| HDD transactions per second versus dat atransfer | | 09-14-2014 11:45 PM | | |

You can post your queries and logs to troubleshooting forums

## Some common issues and their solutions

### Checking connectivity between two nodes

Sometimes you might face network connectivity issues. To test the connectivity between two nodes in a LAN or WAN environment, simply use the Packet Internet Groper (PING) Command as follows:

```
# ping 4.2.2.2

PING 4.2.2.2 (4.2.2.2) 56(84) bytes of data.
64 bytes from 4.2.2.2: icmp _ seq=1 ttl=44 time=203 ms
64 bytes from 4.2.2.2: icmp _ seq=2 ttl=44 time=201 ms
64 bytes from 4.2.2.2: icmp _ seq=3 ttl=44 time=201 ms
```

- `OR`
- `# ping www.google.com`
- `PING google.com (74.135.236.212) 56(84) bytes of data.`

```
64 bytes from 74.135.236.212: icmp _ seq=1 ttl=47 time=284 ms
64 bytes from 74.135.236.212: icmp _ seq=2 ttl=47 time=287 ms
64 bytes from 74.135.236.212: icmp _ seq=3 ttl=47 time=285 ms
```

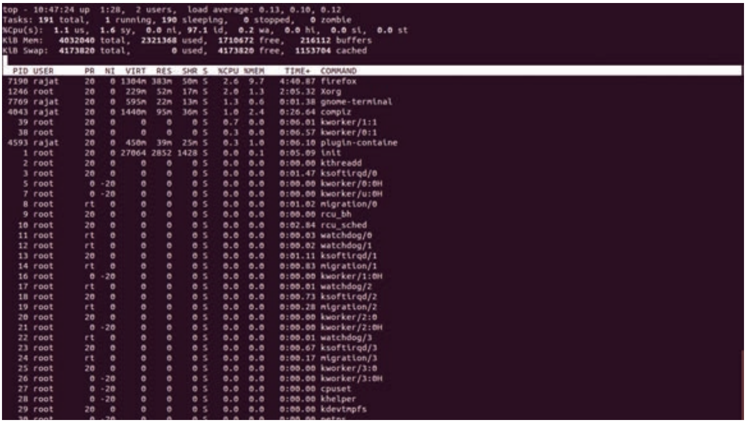
## Defreezing the desktop

Desktop frozen? No issues, and no need to restart. Just follow the steps below.

1. Press the shortcut keys Ctrl+Alt+F2 and you have a console to do your bidding.

2. Find which process is eating your system resources by using the ‘top’ command:

- `# top`



```
top - 10:47:24 up  1:28,  2 users,  load average: 0.13, 0.10, 0.12
Tasks: 191 total,   1 running, 190 sleeping,   0 stopped,   0 zombie
%Cpu(s):  1.1 us,  1.6 sy,  0.0 ni, 97.1 id,  0.2 wa,  0.0 hi,  0.0 si,  0.0 st
KiB Mem:   4032040 total,  2321368 used,  1710672 free,   216112 buffers
KiB Swap:  4173820 total,        0 used,  4173820 free,  1153704 cached

  PID USER      PR  NI  VIRT  RES  SHR S  %CPU %MEM    TIME+  COMMAND
 7190 rajat     20   0 1304m 383m  50m S   2.6  9.7   4:40.87 firefox
 1246 root      20   0  229m  52m  17m S   2.0  1.3   2:05.32 Xorg
 7769 rajat     20   0  595m  22m  13m S   1.3  0.6   0:01.38 gnome-terminal
 4043 rajat     20   0 1440m  95m  36m S   1.0  2.4   0:26.64 compiz
   39 root      20   0     0    0    0 S   0.7  0.0   0:06.01 kworker/1:1
   38 root      20   0     0    0    0 S   0.3  0.0   0:06.57 kworker/0:1
 4593 rajat     20   0  450m  39m  25m S   0.3  1.0   0:06.10 plugin-containe
    1 root      20   0 27064 2852 1428 S   0.0  0.1   0:05.09 init
    2 root      20   0     0    0    0 S   0.0  0.0   0:00.00 kthreadd
    3 root      20   0     0    0    0 S   0.0  0.0   0:01.47 ksoftirqd/0
    5 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 kworker/0:0H
    7 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 kworker/u:0H
    8 root      rt   0     0    0    0 S   0.0  0.0   0:01.02 migration/0
    9 root      20   0     0    0    0 S   0.0  0.0   0:00.00 rcu_bh
   10 root      20   0     0    0    0 S   0.0  0.0   0:02.84 rcu_sched
   11 root      rt   0     0    0    0 S   0.0  0.0   0:00.03 watchdog/0
   12 root      rt   0     0    0    0 S   0.0  0.0   0:00.02 watchdog/1
   13 root      20   0     0    0    0 S   0.0  0.0   0:01.11 ksoftirqd/1
   14 root      rt   0     0    0    0 S   0.0  0.0   0:00.83 migration/1
   16 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 kworker/1:0H
   17 root      rt   0     0    0    0 S   0.0  0.0   0:00.01 watchdog/2
   18 root      20   0     0    0    0 S   0.0  0.0   0:00.73 ksoftirqd/2
   19 root      rt   0     0    0    0 S   0.0  0.0   0:00.28 migration/2
   20 root      20   0     0    0    0 S   0.0  0.0   0:00.00 kworker/2:0
   21 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 kworker/2:0H
   22 root      rt   0     0    0    0 S   0.0  0.0   0:00.01 watchdog/3
   23 root      20   0     0    0    0 S   0.0  0.0   0:00.67 ksoftirqd/3
   24 root      rt   0     0    0    0 S   0.0  0.0   0:00.17 migration/3
   25 root      20   0     0    0    0 S   0.0  0.0   0:00.00 kworker/3:0
   26 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 kworker/3:0H
   27 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 cpuset
   28 root       0 -20     0    0    0 S   0.0  0.0   0:00.00 khelper
   29 root      20   0     0    0    0 S   0.0  0.0   0:00.00 kdevtmpfs
```

“top” lists out all the processes running along with their resource consumption details

3. Use the ‘kill’ command with the PID to terminate the problematic process. Example:

- `# kill 156`

# Tips and Tricks

## Assigning command shortcut

You may be using a lot of long commands in Linux frequently and it can get tedious to type them again and again. Thankfully, Linux has a built in provision to assign command shortcuts using the ‘alias’ command.

1. Use the 'alias' command with the keyword that you would

```
# alias bills='cd /personal/documents/bills'
```

In the above example, the word 'bills' gets assigned to the path for the 'bills' directory.

2. To open the 'bills' directory, all you have to do the next time is type 'bills', which was the shortcut(alias) command that you assigned

```
# bills
```

## Move Thunderbird emails to another Linux installation

One of the pains of moving to a new installation of Linux is the data that is lost. Thankfully, for Thunderbird, its an easy process to move mails.Just follow the steps.

1. Navigate to your Thunderbird email and profile folder (/home//.thunderbird/.default_folder/) and copy the alphanumeric folder from there (eg: vd3gi7k2.default)

2. In the other Linux installation, first install Thunderbird and configure your credentials. Then close it and navigate to the Thunderbird email and profile folder and copy the contents of the alphanumeric folder from the previous installation to the alphanumeric folder of this installation. Simply start Thunderbird and you will find all your emails in the new installation.

## Burning an ISO on to a DVD

Burning an ISO image on to a DVD is also an easy task with Linux. Just use the 'growisofs' command as follows:

```
# growisofs -dvd-compat -Z /dev/dvd=/path/to/ISO file
```

Here, /dev/dvd corresponds to the mount point for your disk.

```
eg: # growisofs -dvd-compat -Z /dev/dvd=/home/HanSolo/Downloads/MillenniumFalcon _ manifest.iso
```

## Creating a multisession DVD

A multisession disk is one in which we can keep adding data in multiple sessions till there is no free space left.

1. To burn the DVD for the first time, type

```
# growisofs -Z /dev/dvd -r -J /path/to/files
Eg: # growisofs -Z /dev/dvd -r -J /home/HanSolo/StarMaps
```

The above example will burn the contents of the folder StarMaps to the DVD.

2. To continue a multisession disk, type

- `# growisofs -M /dev/dvd -r -J /path/to/files`
- `Eg: # growisofs -M /dev/dvd -r -J /home/HanSolo/ShipLogs`

The above example will add files from the folder ShipLogs to the multisession disk while keeping the previous files.

## Virtual terminal

Need to run a program as another user? No need to log out to do that, just press Alt+F2 and Linux will ask you to login as another user.

Once you have done your work, simply type 'exit' and then press Alt+F1 to go back to your first login.

Using different combinations of Alt and Function keys enables you to login as different users.

## Shutting down at specific time

Need to make sure your computer shuts down by a specific time? Just type the following:

1. Shutting down at a precise moment:

- `Eg: # shutdown -h 21:30`

Here, the system will shutdown at 21:30 hours

2. Shutting down after some specified time interval.

- `Eg: # shutdown -h +10`

Here, your system will shutdown after precisely 10 minutes.

## Convert images to video

Use this trick to combine images to make a video. Although it may seem time consuming at first, you'll eventually find it faster than using a GUI. For this purpose you will need the ImageMagick and ffmpeg packages, both of which are available with most Linux distributions.

### 1. Resizing the images

Use the 'mogrify' tool in ImageMagick to resize all the images to the same size. Backup the images first as this will overwrite them.

- `# mogrify -resize 800x600 *.JPG`

Here, the preceding command converts all images, using *JPG , to a width of 800 pixel and a height of 600 pixel.

### 2. Smoothing the image transition

With ImageMagick, you can morph images together to give a smooth in-between transition in the gap between two images.

```
# convert *.JPG -delay 10 -morph 10 %05d.morph.jpg
```

Here, the preceding command takes all the Jpeg images to create 10 images for each gap between image transitions. The images are saved as AAAAA.morph.jpg where A is the number next in the series.

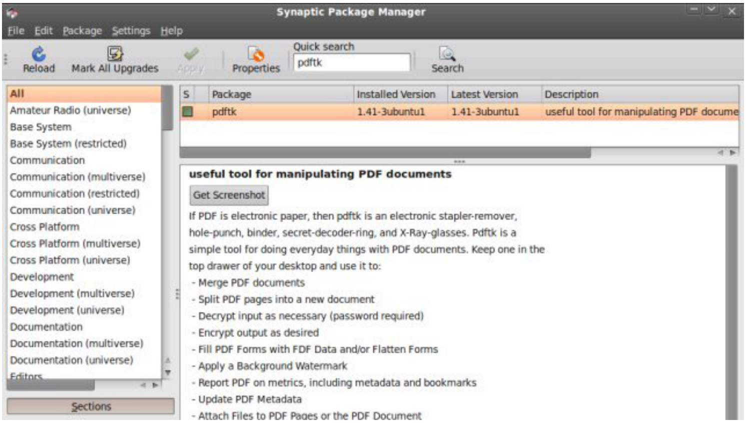
### 3. Making the video

Use ffmpeg to combine the images into a video.

```
# ffmpeg -r 25 -qscale 4 -i %05d.morph.jpg myproduct.mp4
```

Here, it takes all the images that have filenames of AAAAA.morph.jpg and creates a video called called myproduct.mp4. the '-r' option specifies the frame rate and the -qscale option specifies the quality of the video on a scale of 1 to 32 with 1 being the highest quality.

## Password protect your pdf



| S | Package | Installed Version | Latest Version | Description |
|---|---|---|---|---|
| 🟩 | pdftk | 1.41-3ubuntu1 | 1.41-3ubuntu1 | useful tool for manipulating PDF docume |

**useful tool for manipulating PDF documents**

If PDF is electronic paper, then pdftk is an electronic stapler-remover, hole-punch, binder, secret-decoder-ring, and X-Ray-glasses. Pdftk is a simple tool for doing everyday things with PDF documents. Keep one in the top drawer of your desktop and use it to:

- Merge PDF documents
- Split PDF pages into a new document
- Decrypt input as necessary (password required)
- Encrypt output as desired
- Fill PDF Forms with FDF Data and/or Flatten Forms
- Apply a Background Watermark
- Report PDF on metrics, including metadata and bookmarks
- Update PDF Metadata
- Attach Files to PDF Pages or the PDF Document

PDF Toolkit is a comprehensive tool to manipulate PDF documents.

Got a pdf file that you need to keep from prying eyes? Then secure it using the 'pdftk' application. See the following example:

- `# pdftk ‘unsecure.pdf’ output ‘secure.pdf’ user _ pw PROMPT`
- `Eg: # pdftk investments.pdf output investments _ secure.pdf user _ pw PROMPT`

Here, the system will prompt you for a password and once you enter it, you will have a password protected pdf called investments_secure.pdf.

### Make an ISO file out of a directory

It’s easier to make an ISO in command line than using a GUI with the mkisofs command:

- `# mkisofs -o example.iso /source/directory/`
- 
- `E.g: # mkisofs -o mixtape.iso /home/HanSolo/freetunes/`

Here, the ISO file ‘mixtape’ will be created from the files in the source folder ‘freetunes’.

## Linux Basic Cheat Sheet

To become a pro Linux user, you’ll need to learn a lot of commands. A quick look cheat sheet comes in handy here.

### System

Display information about the linux system:

- `# uname -a`

Display how long the system is running:

- `# uptime`

Display system host name:

- `# hostname`

Display current month calendar:

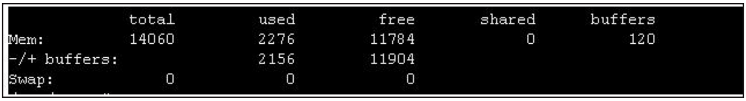
- `# cal`

Display current date and time:

- `# date`

Display who you are logged in as:

- `# whoami`



```
                total        used        free      shared     buffers
Mem:            14060        2276       11784           0         120
-/+ buffers:                 2156       11904
Swap:               0           0           0
```

The ‘free’ command shows the memory status of the computer

## Hardware

Display the used and free memory on computer:

```
# free
```

Display information about the CPU model:

```
# cat /proc/cpuinfo
```

Display information about the hardware memory:

```
# cat /proc/meminfo
```

## User

Display the active user ID with login and group:

```
# id
```

Display last login on the system:

```
# last
```

Display who is logged onto the system:

```
# who
```

## File Command

Create a new directory:

```
# mkdir DirectoryName
```

Create multiple directories:

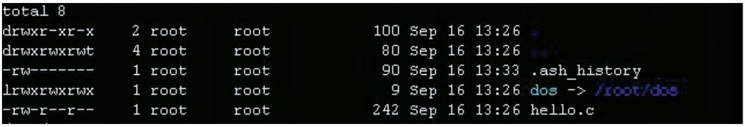
```
# mkdir -p DirectoryName1 DirectoryName2 DirectoryName3
```

Create or update a file:

```
# touch File
```

Display all information about files/directory:

```
# ls -al
```



```
total 8
drwxr-xr-x    2 root     root            100 Sep 16 13:26 .
drwxrwxrwt    4 root     root             80 Sep 16 13:26 ..
-rw-------    1 root     root             90 Sep 16 13:33 .ash_history
lrwxrwxrwx    1 root     root              9 Sep 16 13:26 dos -> /root/dos
-rw-r--r--    1 root     root            242 Sep 16 13:26 hello.c
```

'ls -al' command displays all file and directory information

Display content of file:

```
# more File
```

Display first 10 lines of file:

```
# head File
```

Display last 10 lines of file:

```
# tail File
```

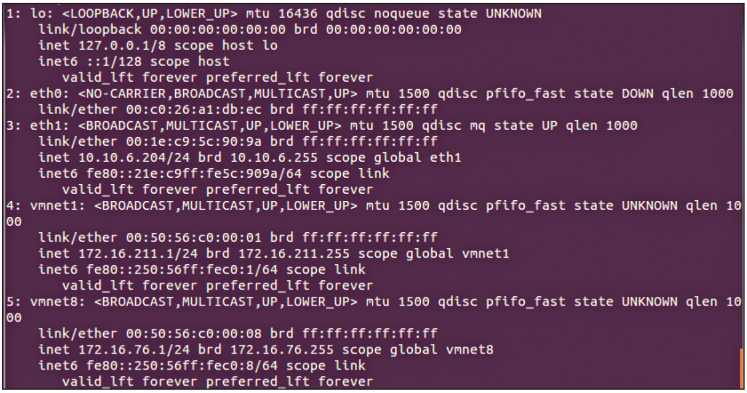
Display the word count of file:

- `# wc File`

## Network

Display all network interfaces and ip address:

- `# ip addr show`



```
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN qlen 1000
    link/ether 00:c0:26:a1:db:ec brd ff:ff:ff:ff:ff:ff
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
    link/ether 00:1e:c9:5c:90:9a brd ff:ff:ff:ff:ff:ff
    inet 10.10.6.204/24 brd 10.10.6.255 scope global eth1
    inet6 fe80::21e:c9ff:fe5c:909a/64 scope link
       valid_lft forever preferred_lft forever
4: vmnet1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN qlen 10
00
    link/ether 00:50:56:c0:00:01 brd ff:ff:ff:ff:ff:ff
    inet 172.16.211.1/24 brd 172.16.211.255 scope global vmnet1
    inet6 fe80::250:56ff:fec0:1/64 scope link
       valid_lft forever preferred_lft forever
5: vmnet8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN qlen 10
00
    link/ether 00:50:56:c0:00:08 brd ff:ff:ff:ff:ff:ff
    inet 172.16.76.1/24 brd 172.16.76.255 scope global vmnet8
    inet6 fe80::250:56ff:fec0:8/64 scope link
       valid_lft forever preferred_lft forever
```

The output of 'ip addr show' displaying all network interfaces and IP addresses

Display ethernet status using Linux tool:

- `# ethtool eth0`

Echo request for testing connection:

- `# ping host`

Display all active listening ports:

- `# netstat -tupl`

## Disk usage

Display free space on mounted file system:

- `# df -h`

Display disk partition sizes and types:

- `# fdisk -l`

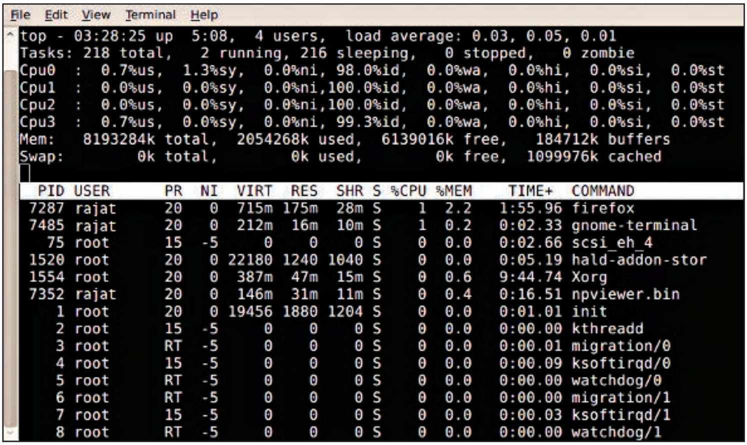
Display disk usage in a readable format:

- `# du -ah`

## Process

Display all current active process:

- `# ps`



```
top - 03:28:25 up  5:08,  4 users,  load average: 0.03, 0.05, 0.01
Tasks: 218 total,   2 running, 216 sleeping,   0 stopped,   0 zombie
Cpu0  :  0.7%us,  1.3%sy,  0.0%ni, 98.0%id,  0.0%wa,  0.0%hi,  0.0%si,  0.0%st
Cpu1  :  0.0%us,  0.0%sy,  0.0%ni,100.0%id,  0.0%wa,  0.0%hi,  0.0%si,  0.0%st
Cpu2  :  0.0%us,  0.0%sy,  0.0%ni,100.0%id,  0.0%wa,  0.0%hi,  0.0%si,  0.0%st
Cpu3  :  0.7%us,  0.0%sy,  0.0%ni, 99.3%id,  0.0%wa,  0.0%hi,  0.0%si,  0.0%st
Mem:   8193284k total,  2054268k used,  6139016k free,   184712k buffers
Swap:        0k total,        0k used,        0k free,  1099976k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
 7287 rajat     20   0  715m 175m  28m S    1  2.2   1:55.96 firefox
 7485 rajat     20   0  212m  16m  10m S    1  0.2   0:02.33 gnome-terminal
   75 root      15  -5     0    0    0 S    0  0.0   0:02.66 scsi_eh_4
 1520 root      20   0 22180 1240 1040 S    0  0.0   0:05.19 hald-addon-stor
 1554 root      20   0  387m  47m  15m S    0  0.6   9:44.74 Xorg
 7352 rajat     20   0  146m  31m  11m S    0  0.4   0:16.51 npviewer.bin
    1 root      20   0 19456 1880 1204 S    0  0.0   0:01.01 init
    2 root      15  -5     0    0    0 S    0  0.0   0:00.00 kthreadd
    3 root      RT  -5     0    0    0 S    0  0.0   0:00.01 migration/0
    4 root      15  -5     0    0    0 S    0  0.0   0:00.09 ksoftirqd/0
    5 root      RT  -5     0    0    0 S    0  0.0   0:00.00 watchdog/0
    6 root      RT  -5     0    0    0 S    0  0.0   0:00.00 migration/1
    7 root      15  -5     0    0    0 S    0  0.0   0:00.03 ksoftirqd/1
    8 root      RT  -5     0    0    0 S    0  0.0   0:00.00 watchdog/1
```

All the current active processes are displayed by the 'ps' command

Display all running processes:

- `# top`

Kill process with pid ID:

- `# kill pid_id`

## Linux Resources

The Linux community is quite vast and hence there are tonnes of resources available online to gain more knowledge, discuss issues, innovate, collaborate, etc.

### Reference websites

The following are a few websites that you should check out for Linux resources like tutorials, groups, discussion forums, news and blogs, directory listing for Linux software and hardware, and much more. The depth of content on these websites will appeal to both, beginners and professionals.

- *www.linux.com*
- *www.linux.org*
- *www.linuxjournal.com*
- *https://sites.google.com/site/easylinuxtipsproject/Home*
- *www.justlinux.com*

### Linux How-to sites

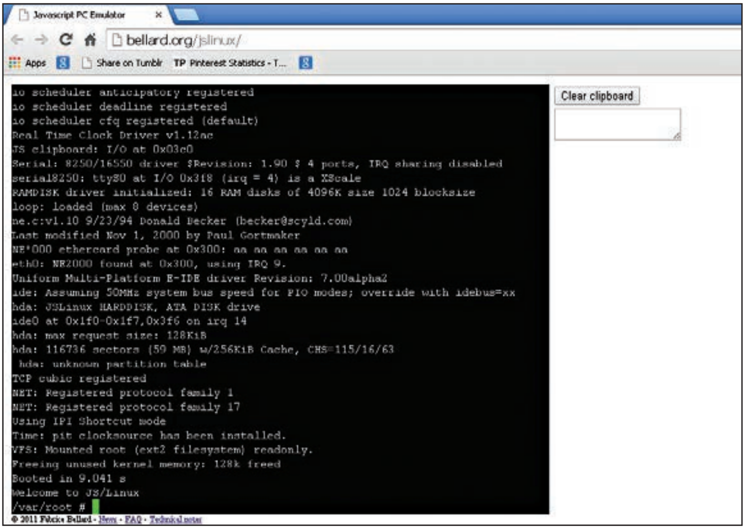
- *www.howtoforge.com/*

- *www.tecmint.com/*
- *www.linux-faqs.info/*

## Linux Software

Once you have your Linux OS going, you'll need some good software to go with it. Take a look at some websites that offer the same.

- *www.linuxsoftware.org*
- *www.linux.com/directory/Software*
- *http://sourceforge.net/directory/os:linux/freshness:recently-updated/*


Javascript PC Emulator
bellard.org/jslinux/
Apps
Share on Tumblr
TP Pinterest Statistics - T...
Clear clipboard
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```
io scheduler anticipatory registered
io scheduler deadline registered
io scheduler cfq registered (default)
Real Time Clock Driver v1.12ac
JS clipboard: I/O at 0x03c0
Serial: 8250/16550 driver $Revision: 1.90 $ 4 ports, IRQ sharing disabled
serial8250: ttyS0 at I/O 0x3f8 (irq = 4) is a XScale
RAMDISK driver initialized: 16 RAM disks of 4096K size 1024 blocksize
loop: loaded (max 8 devices)
ne.c:v1.10 9/23/94 Donald Becker (becker@scyld.com)
Last modified Nov 1, 2000 by Paul Gortmaker
NE*000 ethercard probe at 0x300: aa aa aa aa aa aa
eth0: NE2000 found at 0x300, using IRQ 9.
Uniform Multi-Platform E-IDE driver Revision: 7.00alpha2
ide: Assuming 50MHz system bus speed for PIO modes; override with idebus=xx
hda: JSLinux HARDDISK, ATA DISK drive
ide0 at 0x1f0-0x1f7,0x3f6 on irq 14
hda: max request size: 128KiB
hda: 116736 sectors (59 MB) w/256KiB Cache, CHS=115/16/63
 hda: unknown partition table
TCP cubic registered
NET: Registered protocol family 1
NET: Registered protocol family 17
Using IPI Shortcut mode
Time: pit clocksource has been installed.
VFS: Mounted root (ext2 filesystem) readonly.
Freeing unused kernel memory: 128k freed
Booted in 9.041 s
Welcome to JS/Linux
/var/root # 
```

Linux emulator running in a browser

## Linux Distribution sources

Following are some of the sources from where you can keep track of all the Linux distributions

- *www.distrowatch.com*
- *http://linuxtracker.org/*

## Linux online emulator

- *http://bellard.org/jslinux/*

## Build your own custom Linux system from scratch

- *www.linuxfromscratch.org*

As you can see that Linux is a sophisticated operating system on its own and doesn't play second fiddle to anyone. It is versatile and can be adapted to suit any need. It can do everything that the dominant operating system in the market can and best of all, it can do it for free. Even a large chunk of global enterprises rely on Linux for their operations and IT needs.

Linux has a tremendous community support and is constantly being improved through community efforts. So if you are thinking of adopting Linux, there is really nothing stopping you from exploring this wonderful new world of Linux with all its different flavours. d

digit.in/review

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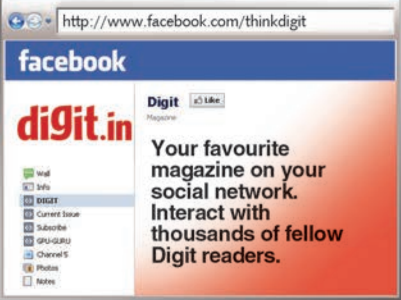

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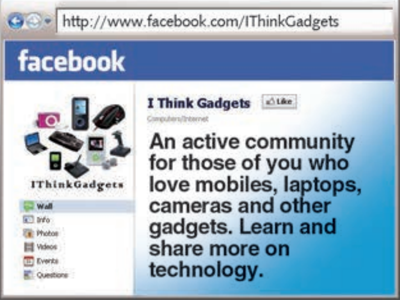

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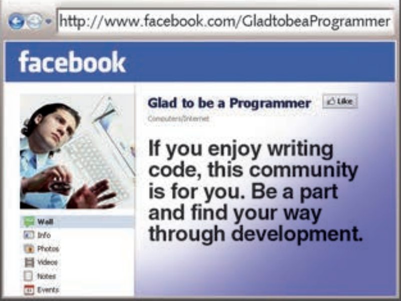

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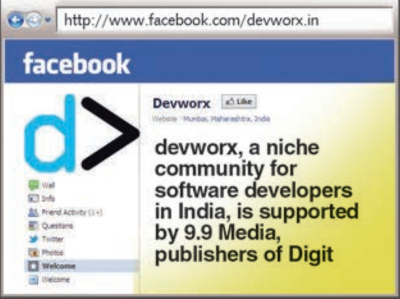

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